CHLOROTHENE (R) SM SOLVENT

153759

MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

Product Code: 16896 Page: 1

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 10/04/85 Date Printed: 05/17/86 MSDS:001111

1. INGREDIENTS:

1,1,1-Trichloroethane	CAS# 000071-55-6	95.5%
1,2-Butylene oxide	CAS# 000106-88-7	
Diethylene Ether	CAS# 000123-91-1	
Nitromethane	CAS# 000075-52-5	

The hazard information presented is based on tests conducted on this or similar mixtures. Therefore, pursuant to the OSHA Hazard Communication Standard (see 29 CFR Part 1910.1200 (g) (2) (B)), the information is based on the tested mixture and not individual ingredients.

2. PHYSICAL DATA:

BOILING POINT: 165F (74C)
VAP PRESS: 100 mmHg @ 20C
VAP DENSITY: 4.55
SOL. IN WATER: 0.07 g/100g @ 25C
SP. GRAVITY: 1.321 @ 25/25C
APPEARANCE: Colorless liquid.
ODOR: Irritating odor at high concentrations.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: TOC, TCC, COC

FLAMMABLE LIMITS
LFL: 7.5% @ 25C
UFL: 15% @ 25C

EXTINGUISHING MEDIA: Water fog.

FIRE & EXPLOSION HAZARDS: Not available.

(Continued on Page 2)

3. FIRE AND EXPLOSION HAZARD DATA: (CONTINUED)

FIRE-FIGHTING EQUIPMENT: Self-contained, positive pressure respiratory equipment.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid open flames, welding arcs or other high temperature sources which induce thermal decomposition.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Water - long term contact can deplete stabilizers followed by slow hydrolysis producing corrosive acid. Avoid prolonged contact with, or storage in, aluminum or its alloys. Metallic aluminum and zinc powders should be avoided.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride and very small amounts of phosgene and chlorine.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Small leaks: Mop up, wipe up, or soak up immediately. Remove to out-of-doors.
Large spills: Evacuate area. Contain liquid; transfer to closed metal containers. Keep out of water supplies.

DISPOSAL METHOD: When disposing of the unused contents, the preferred options are to send to licensed reclaimer, permitted incinerators, or to evaporate small quantities in compliance with local, state, and federal regulations including Subtitle C of the Resource Conservation and Recovery Act. Dumping into sewers, on the ground, or into any body of water is strongly discouraged, and may be illegal. Consult The Dow Chemical Company for further information.

(Continued on Page 3)

6. HEALTH HAZARD DATA:

EYE: May cause pain. May cause slight transient (temporary) irritation with slight transient corneal injury. Vapors may irritate eyes.

SKIN CONTACT: Prolonged or repeated exposure may cause skin irritation. Repeated contact may cause drying or flaking of skin.

SKIN ABSORPTION: A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The LD50 for rabbits is about 15,000 mg/kg.

INGESTION: Single dose oral toxicity is low. The LD50 for rats is >10,000 mg/kg. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

INHALATION: Minimal anesthetic or narcotic effects may be seen in the range of 500-1000 ppm trichloroethane. Progressively higher levels over 1000 ppm may cause dizziness, drunkenness; concentrations as low as 10,000 ppm can cause unconsciousness and death. In confined or poorly ventilated areas, vapors which readily accumulate can cause unconsciousness and death. These high levels may also cause cardiac arrhythmias (irregular heartbeats).

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause any significant adverse effects. Similar formulations did not cause cancer in long-term animal studies. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. In animal studies, has been shown not to interfere with reproduction. Results of in vitro ("test tube") mutagenicity tests have been inconclusive. Results of mutagenicity tests in animals have been negative.

(Continued on Page 4)

7. FIRST AID:

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower. Remove contaminated clothing and wash before reuse.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Call a physician.

NOTE TO PHYSICIAN: Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Exposure may increase "myocardial irritability." Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): 1,1,1-Trichloroethane - OSHA standard is 350 ppm and current ACGIH TLV is 350 ppm (450 ppm STEL).

ACGIH TLV is 25 ppm skin for diethylene ether; the STEL is 100 ppm. OSHA PEL is 100 ppm skin for diethylene ether. Dow Industrial Hygiene Guide for 1,2-butylene oxide is 40 ppm (excursion 100 ppm). ACGIH TLV for nitromethane is 100 ppm with a STEL of 150 ppm.

VENTILATION: Control airborne concentrations below the exposure guideline. Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Lethal concentrations may exist in areas with poor ventilation.

(Continued on Page 5)

8. HANDLING PRECAUTIONS: (CONTINUED)

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved positive pressure self-contained breathing apparatus.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, or full body suit will depend on operation.

EYE PROTECTION: Use safety glasses. Where contact with liquid is likely, chemical goggles are recommended because eye contact with this material may cause pain, even though it is unlikely to cause injury.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Handle with reasonable care. Avoid breathing vapors. Store in a cool dry place. Concentrated vapors of this product are heavier than air and will collect in low areas such ás pits, degreasers, storage tanks, and other confined areas. Do not enter areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance.

1,1,1-Trichloroethane products should not be packaged in aluminum aerosol cans or with finely divided aluminum or its alloys in an aerosol can.

Aluminum is not an acceptable material of construction for pumps, mixers, fittings, storage tanks for 1,1,1-trichloroethane

(Continued on Page 6)

9. ADDITIONAL INFORMATION: (CONTINUED)

products or formulations. Metallic aluminum and zinc powders should be avoided. For additional information on toxicity, handling precautions, and first aid, refer to chlorinated solvents literature form no. 100-5792.

MSDS STATUS: Revised sections 1, 5, 6, 8, and 9.

test
shroud and
nozzles on
distributer Bldg 19

6 19 87
NOT used
on permanent
basis
per T. Swanstrom

AIRCO Carbon

MATERIAL SAFETY DATA SHEET

MSDS Number: 101

Airco Carbon
Division of The BOC Group, Inc
800 Theresia Street, St. Marys, PA 15857
814-834-2801

Emergency Number: (814) 834-2801

PRODUCT:
Carbon/Graphite Grades

November, 1985

I IDENTIFICATION

CHEMICAL FAMILY: Carbon
D.O.T. HAZARD CLASSIFICATION: Inert

II INGREDIENTS (INERT & HAZARDOUS)

INGREDIENTS/COMPOSITION	C.A.S. #	PERCENT	PEL	TLV
Carbon and/or Synthetic Graphite	7440-44-0 or 7782-42-5	>99	15 mg/M^3	10mg/M^3

III PHYSICAL DATA

BOILING POINT: None
MELTING POINT: None
EVAPORATION RATE: 0
SOLUBILITY IN WATER: Insoluble
APPEARANCE: Grey-black solid

VOLATILE BY WEIGHT: <0.01%
SPECIFIC GRAVITY: 1.9-2.2
VAPOR PRESSURE: Negligible at room temp.
VAPOR DENSITY: Negligible at room temp.
ODOR: None

IV FIRE AND EXPLOSION DATA

FLASH POINT: None
LOWER/UPPER EXPLOSIVE LIMIT: None
EXTINGUISHING MEDIA: Water, CO_2, sand
EXTINGUISHING MEDIA TO **AVOID**: None
HAZARDOUS DECOMPOSITION PRODUCTS: In normal combustion, CO_2 and CO.
SPECIAL FIREFIGHTING PROCEDURES: Self-contained breathing apparatus, as normal.
UNUSUAL FIRE AND EXPLOSION DATA: Graphite and carbon dusts are normally not explosive, but these may weakly contribute if the event is initiated by another explosive dust or gas. Graphite and carbon dusts are electrically conductive; dust accumulations may cause electrical short circuits or other electrical malfunctions.

V HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMIT (PEL): SEE SECTION II
PRIMARY ROUTE(S) OF ENTRY: Inhalation of dust.
EFFECTS OF OVEREXPOSURE:
NOT CONSIDERED A CARCINOGEN
EYES: At high dust level, mechanical irritation.
BREATHING: Prolonged and repeated over-exposure may lead to benign pneumoconiosis.
SWALLOWING or SKIN: No effect.
FIRST AID:
IF IN EYES: Flush with water if irritation occurs.
IF ON SKIN, BREATHED OR SWALLOWED: None necessary.
MEDICAL CONDITIONS RECOGNIZED AS POSSIBLY AGGRAVATED BY EXPOSURE:
Individuals with pre-existing chronic respiratory impairments or with serum antitrypsin deficiency may be at increased risk of pneumoconiosis.

6-12-87

WE Buy No (Foundry)
Material From
this Company.

Em

Ernie Please tell me what name you call this by?

E. Moore

SAFETY DEPARTMENT

REQUEST FOR INFORMATION

ON MSDS

6-8-87

TO D. DURHAM DATE ~~6-5-87~~

PLEASE FILL IN ALL THE INFORMATION YOU CAN TO AID IN PLACING THE MSDS ATTACHED INTO OUR RECORDS:

WHO ORDERED THIS MATERIAL? E. Moore

DEPARTMENT (Name and Cost Code) Ydy

WHERE IS THE MATERIAL USED? Yard

WHAT IS IT USED FOR? _____

→ PLEASE RETURN TO THE SAFETY DEPARTMENT A.S.A.P.

CERTECH
INCORPORATED

April 24, 1987

SUBJ: MATERIAL SAFETY DATA SHEET

Dear Sir:

In accordance with OSHA Legislation 1910.1200 "HAZARD COMMUNICATION" we submit our current Material Safety Data Sheet(s) for the following product(s):

1714V	1814F	414G	1914H
733K	114P	114P-3	414S
853X			

Please let us know if we can be of additional assistance.

All statements, technical information and recommendations contained herein are based on tests and data which this Company believes to be currently reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use. Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product. This information is offered solely for use in your evaluation of this product in respect to safety, health and environmental hazards.

PREPARED BY: Raymond A. Pietras

TITLE: Ceramic Engineer

C01337

1 Park Place West, Wood-Ridge, New Jersey 07075 U.S.A. • Phone 201-939-7400 • Telex: 13-9148 CERTECH WDRG

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY *(As Used on Label and List)*	*Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.*
PREFORMED CERAMIC CORES	

Section I

Manufacturer's Name CERTECH, INC.	Emergency Telephone Number 201-939-7400
Address *(Number, Street, City, State, and ZIP Code)* 1 PARK PLACE WEST	Telephone Number for Information 201-939-7400
WOOD-RIDGE, NEW JERSEY 07075	Date Prepared APRIL 24, 1987
	Signature of Preparer *(optional)*

Section II — Hazardous Ingredients/Identity Information

WHEN IN THE FORM OF DUST Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% *(optional)*
SILICA CRISTOBALITE CAS # [14464-46-1]	5 mg/m^3	0.05 mg/m^3	N/A	
SILICA, FUSED CAS # [60676-86-0]	10 mg/m^3	0.1 mg/m^3	N/A	
ZIRCONIUM SILICATE CAS # [7440-67-2]	5 mg/m^3	10 mg/m^3	N/A	
ALUMINUM OXIDE CAS # [1344-28-1]	NOT AVAILABLE	10 mg/m^3	N/A	

Section III — Physical/Chemical Characteristics

Boiling Point	N/A	Specific Gravity (H_2O = 1)	2.20 - 3.25
Vapor Pressure (mm Hg.)	N/A	Melting Point	N/A
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A

Solubility in Water
NIL

Appearance and Odor
WHITE TO BEIGE IN COLOR, NO ODOR, SOLID, MOLDED SHAPE

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
NONE	N/A	N/A	N/A

Extinguishing Media
NOT COMBUSTIBLE

Special Fire Fighting Procedures
NONE

Unusual Fire and Explosion Hazards
NONE KNOWN

Section V — Reactivity Data

Stability			
	Unstable		Conditions to Avoid
	Stable	X	Material is stable, and non reactive under ordinary conditions.

Incompatibility (*Materials to Avoid*) Attacked by strong alkalis, reacts with hydrofluoric acid to generate volatile SiF_4

Hazardous Decomposition or Byproducts When exposed to high temperatures, silica can change crystal structure to form tridymite (above 870°C) or cristobalite (above 1470°C) which have greater health hazards than fused silica.

Hazardous Polymerization			
	May Occur		Conditions to Avoid
	Will Not Occur	X	N/A

Section VI — Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
	YES	NO	POSSIBLE

Health Hazards (*Acute and Chronic*) These materials as received by the customer are sintered solids. Dust will occur only if the product is crushed, abraded or cut. Any inhalation of dust is harmful to your health and excessive inhalation will increase the risk of serious lung and respiratory disease. Acute - causes irritation of eyes, nose, throat and skin by dust. Chronic - None known to eyes or skin; Respiratory - may cause lung damage from dust.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
Unknown	Unknown	Unknown	Unknown

Signs and Symptoms of Exposure Exposure to dust: Cough, shortness of breath, tightness in chest, eye irritation, dry, itchy skin.

Medical Conditions Generally Aggravated by Exposure Any pre-existing respiratory or pulmonary diseases or conditions.

Emergency and First Aid Procedures: Eyes - Flush eyes thoroughly with running water for 15 min Call physician if irritation persists.

Skin - Wash affected area with soap and water. Call physician if condition persists.

Inhalation - Remove to fresh air. Seek medical attention for treatment, support & observation as needed. Ingestion - Call physician, induce vomiting only upon advice of physician.

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled
For Dust - Provide ventilation. Protect against eye contact and inhalation of dust. Pick up dust without raising dust clouds. (Use vacuum or damp sweep) Place in closed plastic bags for disposal.

Waste Disposal Method
To land fill in accordance with local, State and Federal regulations.

Precautions to Be Taken in Handling and Storing
Normal precautions for nuisance dust should be observed. Take care to minimize the generation of airborne dust.

Other Precautions
Avoid prolonged contact with skin. There is an increased risk of impaired health due to a combination of smoking and silica dust exposure.

Section VIII — Control Measures

Respiratory Protection (*Specify Type*)
For prolonged dust exposure select respirator per OSHA 29 CFR 1910-134

Ventilation		
	Local Exhaust: Ventilation to meet TLV requirements	Special: NONE
	Mechanical (*General*): N/A	Other: NONE

Protective Gloves	Eye Protection
Recommended for prolonged contact.	Select goggles per OSHA 29 CFR 1910-133

Other Protective Clothing or Equipment NOT REQUIRED

Work/Hygienic Practices
Good housekeeping & handling procedures should minimize the generation of airborne dust. Normal work practices for a nuisance dust.

* USGPO 1986-491-529/45775

Conoco Fleet Motor Oil

MATERIAL SAFETY DATA SHEET

I. MATERIAL IDENTIFICATION

Name: Conoco Fleet Motor Oil SAE 10W, 10W LP, 15W-40, 20-20W, 30, 40, 50/ Fleet Supreme 10W-30, 15W-40
Conoco Product Code: 6210/6211/6220/6230/6240/6250/ 6260/6261/6271
Synonyms: Lubricating Oil, Motor Oil
Chemical Family: Petroleum Hydrocarbon
Manufacturer: Conoco Inc.
Address: P.O. Box 1267, Ponca City, OK 74603

CAS Registry No.: Mixture
Transportation Emergency No.: (800) 424-9300 (Chemtrec)
Product Information No.: (405) 767-6000

II. HAZARDOUS INGREDIENTS — HAZARD DATA

Hazard Determination:
Health Effect Properties: None. — Not applicable.

Physical Effect Properties:
Product/Mixture: None. — Not applicable.

III. PHYSICAL DATA

Appearance and Odor: Dark brown liquid; mild petroleum hydrocarbon odor.

Boiling Range (° F)	650-1200	Specific Gravity (H_2O=1)	0.88
Vapor Pressure (mmHg)	Nil	% Volatile (by volume)	Nil
Vapor Density (Air=1)	Not Applicable	Evaporation Rate (Ether=1)	Nil
Solubility in Water	Insoluble		

IV. REACTIVITY DATA — Stable: X — Unstable:

Hazardous Decomposition Products: Normal combustion forms carbon dioxide; incomplete combustion may produce carbon monoxide.

Conditions To Avoid: Strong oxidizing materials, heat, flame.

Hazardous Polymerization: Will not occur.

V. FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method used): 340° F (PMCC) Autoignition Temperature: 650° F
Handle and store in accordance with NFPA procedure for Class III B Combustible Liquids.

Extinguishing Media: Use water spray, dry chemical, foam, or carbon dioxide.

Special Fire Fighting Procedures: Water or foam may cause frothing. Use water to keep fire-exposed containers cool. Water spray may be used to flush spills away from exposures.

Unusual Fire and Explosion Hazards: Products of combustion may contain carbon monoxide, carbon dioxide, and other toxic materials. Do not enter enclosed or confined space without proper protective equipment including respiratory protection.

V. FIRE AND EXPLOSION HAZARD DATA (continued)

National Fire Protection Agency (NFPA) CLASSIFICATION	HAZARD RATING
Health 0 Fire 1 Reactivity 0	Least - 0 Slight - 1 Moderate - 2 High - 3 Extreme - 4

VI. TRANSPORTATION AND STORAGE — DOT HAZARD CLASS: Not Applicable

Precautions To Be Taken In Handling And Storing: Product is Class III B Combustible Liquid per NFPA Code No. 30-1984. Store and handle accordingly.

Shipping Paper Description: Not D.O.T. Regulated.

Placard: Not D.O.T. Regulated.

D.O.T. Label: Not Regulated.

OSHA Label (Recommended): CAUTION: Prolonged or repeated skin contact with used motor oil may be harmful. Wash thoroughly with soap and water after use.

VII. HEALTH HAZARD INFORMATION

PEL Not Established TLV Not Established
Ceiling Value Not Established AEL Not Established

Primary Route of Entry: Skin.

Signs and Symptoms of Exposure/Medical Conditions Aggravated By Exposure:
No adverse health effect has been identified specifically for this product. Health effect information from animal and human studies has been included on related materials, even though health experts may disagree as to the significance of this data.

Mouse skin painting studies have shown that highly solvent-refined petroleum distillates having a boiling point below 700° F, and which are similar to ingredients in this product, have not caused skin tumors. The product may cause irritation to eyes, lungs, or skin after prolonged or repeated exposure.

Laboratory studies have shown that mice developed skin cancer following repeated skin application of, and continuous exposure to, used motor oil. In these studies, the used motor oil was not removed between applications. Health hazards to used motor oil can be minimized by avoiding prolonged skin contact.

Listed as Carcinogen or Potential Carcinogen by: NTP No IARC No OSHA No

VIII. EMERGENCY AND FIRST AID PROCEDURES

Eyes: Immediately wash with fresh water for at least 15 minutes and get medical attention.

Skin: Remove contaminated clothing as soon as possible. Wash exposed skin thoroughly with soap and water. If irritation persists, consult a physician.

Launder contaminated clothing before reuse. Extremely contaminated leather shoes should be discarded.

If exposed to hot oil, immediately cool with cold water. Do not attempt to remove oil but continue to cool exposed areas with cold packs and seek medical attention.

Inhalation: If overexposure occurs, remove individual to fresh air. If breathing stops, administer artificial respiration.

Ingestion: If this material is swallowed, do not induce vomiting. If vomiting begins, lower victim's head in an effort to prevent vomitus from entering lungs. Immediately consult a physician. Do not attempt to give liquid to an unconscious person.

Note to Physicians: Gastric lavage by qualified medical personnel may be considered, depending on quantity of material ingested.

IX. SPILL, LEAK AND DISPOSAL PROCEDURES

RCRA HAZARDOUS WASTE: Yes _____ No __X__

In Case Of Spill Or Leak: Contain spill immediately in smallest area possible. Recover as much of the product itself as possible by such methods as vacuuming, followed by soaking up residual fluids by use of absorbent materials. Remove contaminated items including solids and place in proper container for disposal. Avoid washing, draining or directing material to storm or sanitary sewers.

Waste Disposal Method: Recycle as much of the recoverable product as possible. Dispose of nonrecyclable material by such methods as controlled incineration, complying with federal, state and local regulations.

X. PRECAUTIONARY MEASURES

Respiratory Protection: None required except under unusual circumstances such as described in Section V.

Ventilation: Normal shop ventilation.

Protective Gloves: None required.

Eye Protection: None required.

Other Protective Equipment: None required.

The above data is based on tests and experience which Conoco believes reliable and are supplied for informational purposes only. CONOCO DISCLAIMS ANY LIABILITY FOR DAMAGE OR INJURY WHICH RESULTS FROM THE USE OF THE ABOVE DATA AND NOTHING CONTAINED THEREIN SHALL CONSTITUTE A GUARANTEE, WARRANTY (INCLUDING WARRANTY OF MERCHANTABILITY) OR REPRESENTATION (INCLUDING FREEDOM FROM PATENT LIABILITY) BY CONOCO WITH RESPECT TO THE DATA, THE PRODUCT DESCRIBED, OR THEIR USE FOR ANY SPECIFIC PURPOSE, EVEN IF THAT PURPOSE IS KNOWN TO CONOCO.

Polyamine Polyamide Solution

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved OMB No. 44-R138

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
POLY-CARB, INC	216/248-1223

ADDRESS (Number, Street, City, State, and ZIP Code)
33095 Bainbridge Rd., Solon, OH 44139

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
	MARK-103 PART B

CHEMICAL FAMILY	FORMULA
Polyamine Polyamide Solution	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	.78.
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	Amber		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

(Continued on reverse side)

C01339

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

Direct contact with the skin can cause irritation.

EMERGENCY AND FIRST AID PROCEDURES

Flush immediately with water and report to doctor.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR	X	CONDITIONS TO AVOID Contact with resin
	WILL NOT OCCUR		solution.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Collect in disposable containers. Avoid physical contact.

WASTE DISPOSAL METHOD

Approved landfill

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES yes	EYE PROTECTION yes

OTHER PROTECTIVE EQUIPMENT

Safety shower and eye wash facility.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep lid closed and away from open flame.

Fatal if taken internally. Protective clothing, gloves, goggles required.

OTHER PRECAUTIONS

Epoxy Resin

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
POLY-CARB, INC	216/248-1223

ADDRESS (Number, Street, City, State, and ZIP Code)
33095 Bainbridge Rd., Solon, OH 44139

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
	MARK-103 PART A

CHEMICAL FAMILY	FORMULA
Epoxy Resin	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	.96
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER			

APPEARANCE AND ODOR Amber

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel

EXTINGUISHING MEDIA Carbon-dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

Direct contact with the skin can cause irritation

EMERGENCY AND FIRST AID PROCEDURES

Flush immediately with water and report to doctor.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR	X	CONDITIONS TO AVOID
	WILL NOT OCCUR		Contact with Polyamines, Polyamides

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Collect in disposable containers, Avoid physical contact.

WASTE DISPOSAL METHOD

Approved landfill.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES yes	EYE PROTECTION yes

OTHER PROTECTIVE EQUIPMENT

Safety shower and eye wash facility.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep lid closed and away from open flame. Fatal if taken internally. Protective clothing, gloves and goggles required.

OTHER PRECAUTIONS

MATERIAL SAFETY DATA SHEET

Brass Scrap

I. MATERIAL IDENTIFICATION

Manufacturer's Name: Newell Enterprises, Inc. Telephone Number: 512 222-9511
Address: P.O. Box 9132
San Antonio, Texas 78204
Material Name: Brass Scrap

II. HAZARDOUS INGREDIENTS

	CAS Number	%		OSHA 8-hr TWA	ACGIH 8-hr TWA (1984-85)	ACGIH STEL (1984-85)
Copper	(7440-50-8)	≥49	(Dust)	1 mg/m^3	1 mg/m^3	2 mg/m^3
			(Fume)	0.1 mg/m^3	0.2 mg/m^3	--
Zinc	(1314-13-2)	<51	(Dust)	--	(2)	--
			(Fume)	5 mg/m^3	5 mg/m^3 (as zinc oxide)	10 mg/m^3
Manganese	(7439-96-5)	<13	(Dust)	5 mg/m^3 *	5 mg/m^3 *	--
			(Fume)	--	1 mg/m^3	3 mg/m^3
Lead	(7439-92-1)	≤ 8		0.05 mg/m^3	0.15 mg/m^3	0.45 mg/m^3
Aluminum	(7429-90-5)	< 8	(Dust)	--	10 mg/m^3	20 mg/m^3
			(Fume)	--	5 mg/m^3	--
Tin	(7440-31-5)	< 7		2 mg/m^3	2 mg/m^3	4 mg/m^3
Silicon	(7440-21-3)	< 6		(1)	(2)	20 mg/m^3
Iron	(1309-37-1)	≤ 4		10 mg/m^3	5 mg/m^3 (as iron oxide fume)	10 mg/m^3
Nickel	(7440-02-0)	≤ 4		1 mg/m^3	1 mg/m^3	--
Antimony	(7440-36-0)	< 1		0.5 mg/m^3	0.5 mg/m^3	--
Arsenic	(7440-38-2)	< 1		0.01 mg/m^3	0.2 mg/m^3	--
Silver	(7440-22-4)	< 1		0.01 mg/m^3	0.1 mg/m^3	--

* Ceiling Limit

(1) < 1% quartz, 15 mg/m^3 of total dust or 5 mg/m^3 respirable dust.

(2) < 1% quartz, 10 mg/m^3 of total dust or 5 mg/m^3 respirable dust.

Note: antimony trioxide, arsenic, and nickel have been identified as potential human carcinogens. See Section VI, Health Hazard Data.

III. PHYSICAL DATA

Melting Point: 888 - 1066° C
Specific Gravity: 7.70 - 8.86
Boiling Point (of copper): 2324° C
Vapor Pressure: 1 mm Hg @ 1628° C (of copper)
Solubility in water: insoluble

Appearance: dependent on composition of scrap metal, processing method used, and existing protective coatings.

C01340

IV. FIRE AND EXPLOSION DATA

Flash Point: information not available Flammable Limits: information not available
Autoignition Temperature: information not available

Brass scrap itself presents a negligible fire and explosion hazard. A moderate fire and explosion hazard may exist due to contamination, or when the material is finely divided and exposed to heat or flames.

Fire Extinguishing Methods: Use dry chemical or sand. Fire fighters should wear self-contained breathing apparatus and full protective clothing.

V. REACTIVITY DATA

Copper reacts violently with acetylene. Material may also be incompatible with acids, bases, and oxidizers. Dust presents moderate fire and explosion hazards. Molten scrap metal may react violently with water. For additional information, users should consult data sheets on individual component elements.

VI. HEALTH HAZARD DATA

TLV: see Section II.
Primary Routes of Entry: inhalation of dust or fume.

Under normal handling and use, exposure to the massive form of brass scrap presents few health hazards. Thermal cutting and melting of scrap may produce fumes containing the component elements, and breathing these fumes may present potentially significant health hazards. The exposure levels in Section II are relevant to fumes and dusts. Special precautions should be taken if scrap is contaminated; see Section IX.

Fumes of copper, manganese, and zinc oxide may cause metal fume fever with flu-like symptoms. Copper may cause skin and hair discoloration; silver may cause a greyish pigmentation of the skin, and can cause irritation of the skin and mucous membranes. Overexposure to dusts and especially fumes containing component elements may cause skin, nose, mouth, and eye irritation and lung changes in workers, potentially leading to pulmonary diseases.

Nickel compounds have been associated with allergic reactions and rashes, and lung changes. Nickel is a respiratory irritant and can cause pneumonitis. Inhalation of finely divided aluminum powder may cause pulmonary fibrosis.

Overexposure to manganese fumes can cause chronic manganese poisoning. Early symptoms include headaches, apathy, sleepiness, and weakness or cramps in the legs. Chronic overexposure can affect the central nervous system, ultimately leading to emotional disturbances, gait and balance difficulties, and paralysis.

Overexposure to antimony may cause gastrointestinal upset and various nervous complaints, such as sleeplessness, irritability, and muscular pains. Inhalation of lead fumes or dusts, or ingestion of lead compounds, can cause lead poisoning, characterized by abdominal pains, joint and muscle pains, or weakness. Prolonged overexposure can cause central nervous system disorders.

Overexposure to arsenic fumes or dusts can lead to arsenic poisoning, characterized by nausea, vomiting, and diarrhea. Prolonged overexposure can lead to liver and kidney damage, central nervous system disorders, and ultimately death. Arsenic can cause skin irritation and allergic reactions.

Antimony trioxide, arsenic, and nickel have been identified as potential cancer-causing agents.

FIRST AID:

Eye Contact:	Flush well with running water to remove particulate. Get medical attention.
Skin Contact:	Brush off excess dust. Wash area well with soap and water.
Inhalation:	Remove to fresh air. Get medical attention.
Ingestion:	Seek medical help if large quantities of material have been ingested. (Ingestion of significant amounts of scrap metal is unlikely.)

VII. SPILL PROCEDURES

No special precautions are necessary for spills of bulk material. If large quantities of dust are spilled, remove by vacuuming or wet sweeping to prevent heavy concentrations of airborne dust. Clean-up personnel should wear respirators and protective clothing.

Scrap metal can be reclaimed for reuse. Follow Federal, State, and Local regulations regarding disposal.

VIII. SPECIAL PROTECTION INFORMATION

Use general and local exhaust ventilation to keep airborne concentrations of dust or fumes below the TLV. Employees should wear MSHA or NIOSH approved respirators for protection against airborne dust or fumes. Full protective clothing should be worn by workers exposed to heavy concentrations of dust, and showering should be required before changing into street clothes. Gloves and barrier creams may be necessary to prevent skin sensitization and dermatitis.

Approved safety glasses or goggles should be worn when working with dusty material. Safety eyewash stations should be provided in close proximity to work areas.

Pre-employment and periodic medical evaluations should be provided. Attention should be directed toward skin, eyes, respiratory tract, blood, kidneys, pulmonary function, and neurologic health. Chest X-rays should be included if symptoms are present.

Food should not be consumed in the work area.

Special attention is drawn to the requirements of the Occupational Safety and Health Administration standards for lead (29 CFR 1910.1025) and arsenic (29 CFR 1910.1018). State OSHA programs will also have similar requirements.

Special precautions should be taken if scrap is contaminated; see Section IX.

IX. SPECIAL PRECAUTIONS

Use good housekeeping practices to prevent accumulations of dust and to keep airborne dust concentrations at a minimum. Avoid breathing dust or fumes.

Store material away from incompatible materials, and keep dust away from sources of ignition.

This material is potentially contaminated with coatings, paints, preservatives, cutting oils, and other contaminants. If the material is contaminated, special precautions (such as process control and personal protective equipment, appropriate to the nature of the suspected contaminants) should be taken to avoid resulting exposures when handling, cutting (mechanical or thermal), and/or melting.

Prepared by: Institute of Scrap Iron and Steel (ISIS)
in consultation with JRB Associates

Date Prepared: September 1985

MATERIAL SAFETY DATA SHEET

I. MATERIAL IDENTIFICATION

Manufacturer's Name: Newell Enterprises, Inc.
Address: P.O. Box 9132
San Antonio, Texas 78204

Telephone Number: 512 222-9511

Material Name: Bronze Scrap

II. HAZARDOUS INGREDIENTS

	CAS Number	%		OSHA 8-hr TWA	ACGIH 8-hr TWA (1984-85)	ACGIH STEL (1984-85)
Copper	(7440-50-8)	>66	(Dust) (Fume)	1 mg/m^3 0.1 mg/m^3	1 mg/m^3 0.2 mg/m^3	2 mg/m^3 --
Lead	(7439-92-1)	≤25		0.05 mg/m^3	0.15 mg/m^3	0.45 mg/m^3
Tin	(7440-31-5)	≤20		2 mg/m^3	2 mg/m^3	4 mg/m^3
Aluminum	(7429-90-5)	≤15	(Dust) (Fume)	-- --	10 mg/m^3 5 mg/m^3	20 mg/m^3 --
Manganese	(7439-96-5)	≤14	(Dust) (Fume)	5 mg/m^3 * --	5 mg/m^3 * 1 mg/m^3	-- 3 mg/m^3
Iron	(1309-37-1)	≤ 6		10 mg/m^3	5 mg/m^3 (as iron oxide fume)	10 mg/m^3
Nickel	(7440-02-0)	≤ 6		1 mg/m^3	1 mg/m^3	--
Zinc	(1314-13-2)	≤ 6	(Dust) (Fume)	-- 5 mg/m^3	(2) 5 mg/m^3 (as zinc oxide)	-- 10 mg/m^3
Silicon	(7440-21-3)	≤ 4		(1)	(2)	20 mg/m^3
Phosphorus	(7723-14-0)	< 2		0.1 mg/m^3	0.1 mg/m^3	0.3 mg/m^3
Antimony	(7440-36-0)	< 1		0.5 mg/m^3	0.5 mg/m^3	--
Arsenic	(7440-38-2)	< 1		0.01 mg/m^3	0.2 mg/m^3	--
Chromium	(7440-47-3)	< 1		1 mg/m^3	0.5 mg/m^3	--
Cobalt	(7440-48-4)	< 1		0.1 mg/m^3	0.1 mg/m^3	--

* Ceiling Limit

(1) <1% quartz, 15 mg/m^3 of total dust or 5 mg/m^3 respirable dust.

(2) <1% quartz, 10 mg/m^3 of total dust or 5 mg/m^3 respirable dust.

Note: Antimony trioxide, arsenic, chromium, cobalt-chromium alloy, and nickel have been identified as potential human carcinogens. See Section VI, Health Hazard Data.

C01341

III. PHYSICAL DATA

Melting Point: 999 - 1077° C
Specific Gravity: 7.50 - 9.30
Boiling Point (of copper): 2324° C
Vapor Pressure: 1 mm Hg @ 1628° C (of copper)
Solubility in water: insoluble

Appearance: dependent on composition of scrap metal, processing method used, and existing protective coatings.

IV. FIRE AND EXPLOSION DATA

Flash Point: information not available
Flammability Limits: information not available
Autoignition Temperature: information not available

Bronze scrap itself presents a negligible fire and explosion hazard. A moderate fire and explosion hazard may exist due to contamination, or when the material is finely divided and exposed to heat or flames. Phosphorus dust presents a serious fire and explosion hazard when exposed to heat or oxidizers.

Fire Extinguishing Methods: Use dry chemical or sand. Fire fighters should wear self-contained breathing apparatus and full protective clothing.

V. REACTIVITY DATA

Copper reacts violently with acetylene. Material may also be incompatible with acids, bases, and oxidizers. Dust presents moderate fire and explosion hazards. Molten scrap metal may react violently with water. For additional information, users should consult data sheets on individual component elements.

VI. HEALTH HAZARD DATA

TLV: see Section II.
Primary Routes of Entry: inhalation of dust or fume.

Under normal handling and use, exposure to the massive form of bronze scrap presents few health hazards. Thermal cutting and melting of scrap may produce fumes containing the component elements, and breathing these fumes may present potentially significant health hazards. The exposure levels in Section II are relevant to fumes and dusts. Special precautions should be taken if scrap is contaminated; see Section IX.

Fumes of copper, manganese, and zinc oxide may cause metal fume fever with flu-like symptoms. Copper may cause skin and hair discoloration. Overexposure to dusts and especially fumes containing component elements may cause skin, nose, mouth, and eye irritation and lung changes in workers, potentially leading to pulmonary diseases.

Chromium and nickel compounds have been associated with allergic reactions and rashes, and lung changes. Nickel is a respiratory irritant and can cause pneumonitis. Inhalation of finely divided aluminum powder may cause pulmonary fibrosis. Cobalt is irritating to the eyes and skin and can cause allergic dermatitis, especially in combination with nickel and chromium.

Overexposure to manganese fumes can cause chronic manganese poisoning. Early symptoms include headaches, apathy, sleepiness, and weakness or cramps in the legs. Chronic overexposure can affect the central nervous system, ultimately leading to emotional disturbances, gait and balance difficulties, and paralysis.

Overexposure to antimony may cause gastrointestinal upset and various nervous complaints, such as sleeplessness, irritability, and muscular pains. Inhalation of lead fumes and dusts, or ingestion of lead compounds, can cause lead poisoning, characterized by abdominal pains, joint and muscle pains, or weakness. Prolonged overexposure can cause central nervous system disorders.

Overexposure to arsenic fumes or dusts can lead to arsenic poisoning, characterized by nausea, vomiting, and diarrhea. Prolonged overexposure can lead to liver and kidney damage, central nervous system disorders, and ultimately death. Arsenic can cause skin irritation and allergic reactions.

Overexposure to tin dusts may cause irritation of the skin and mucous membranes, and may result in a benign pneumoconiosis (stannosis). Absorption of large quantities of phosphorus can cause liver damage and necrosis of the jaw.

Antimony trioxide, arsenic, chromium, cobalt-chromium alloy, and nickel have been identified as potential cancer-causing agents.

FIRST AID:

Eye Contact:	Flush well with running water to remove particulate. Get medical attention.
Skin Contact:	Brush off excess dust. Wash area well with soap and water.
Inhalation:	Remove to fresh air. Get medical attention.
Ingestion:	Seek medical help if large quantities of material have been ingested. (Ingestion of significant amounts of scrap metal is unlikely.)

VII. SPILL PROCEDURES

No special precautions are necessary for spills of bulk material. If large quantities of dust are spilled, remove by vacuuming or wet sweeping to prevent heavy concentrations of airborne dust. Clean-up personnel should wear respirators and protective clothing.

Scrap metal can be reclaimed for reuse. Follow Federal, State, and Local regulations regarding disposal.

VIII. SPECIAL PROTECTION INFORMATION

Use general and local exhaust ventilation to keep airborne concentrations of dust or fumes below the TLV. Employees should wear MSHA or NIOSH approved respirators for protection against airborne dust or fumes. Full protective clothing should be worn by workers exposed to heavy concentrations of dust, and showering should be required before changing into street clothes. Gloves and barrier creams may be necessary to prevent skin sensitization and dermatitis.

Approved safety glasses or goggles should be worn when working with dusty material. Safety eyewash stations should be provided in close proximity to work areas.

Pre-employment and periodic medical evaluations should be provided. Attention should be directed toward skin, eyes, teeth, respiratory tract, liver, kidneys, blood, pulmonary function, and neurologic health. Chest X-rays should be included if symptoms are present.

Food should not be consumed in the work area.

Special attention is drawn to the requirements of the Occupational Safety and Health Administration standards for lead (29 CFR 1910.1025) and arsenic (29 CFR 1910.1018). State OSHA programs will also have similar requirements.

Special precautions should be taken if scrap is contaminated; see Section IX.

IX. SPECIAL PRECAUTIONS

Use good housekeeping practices to prevent accumulations of dust and to keep airborne dust concentrations at a minimum.

Store material away from incompatible materials, and keep dust away from sources of ignition.

This material is potentially contaminated with coatings, preservatives, oil, and other contaminants. If the material is contaminated, special precautions (such as process control and personal protective equipment, appropriate to the nature of the suspected contaminants) should be taken to avoid resulting exposures when handling, cutting (mechanical or thermal), and/or melting.

Prepared by: Institute of Scrap Iron and Steel (ISIS)
in consultation with JRB Associates

Date Prepared: September 1985

Acetone

J. T. BAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
MATERIAL SAFETY DATA SHEET
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

A0445 -01 ACETONE PAGE: 1
EFFECTIVE: 10/11/85 ISSUED: 01/23/86

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: ACETONE
FORMULA: (CH3)2CO
FORMULA WT: 58.08
CAS NO.: 00067-64-1
NIOSH/RTECS NO.: AL3150000
COMMON SYNONYMS: DIMETHYL KETONE; METHYL KETONE; 2-PROPANONE
PRODUCT CODES: 9010,9006,9002,9254,9009,9001,9004,5356,A134,9007,9005,9008

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	- 1	
FLAMMABILITY	- 3	(FLAMMABLE)
REACTIVITY	- 2	
CONTACT	- 1	

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

DANGER
EXTREMELY FLAMMABLE
HARMFUL IF SWALLOWED OR INHALED
CAUSES IRRITATION

KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ACETONE	90-100	67-64-1

SECTION III - PHYSICAL DATA

BOILING POINT: 56 C (133 F)
VAPOR PRESSURE(MM HG): 181

MELTING POINT: -95 C (-139 F)
VAPOR DENSITY(AIR=1): 2

SPECIFIC GRAVITY: 0.79 (H2O=1)
EVAPORATION RATE: 5.6 (BUTYL ACETATE=1)

CONTINUED ON PAGE: 2

C01342

SECTION III - PHYSICAL DATA (CONTINUED)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID WITH FRAGRANT SWEET ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: -18 C (0 F) NFPA 704M RATING: 1-3-0

FLAMMABLE LIMITS: UPPER - 13 % LOWER - 2 %

FIRE EXTINGUISHING MEDIA
USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE.
(WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED (POSITIVE PRESSURE IF AVAILABLE) BREATHING APPARATUS WITH FULL FACEPIECE. MOVE EXPOSED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1780 MG/M3 (750 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 2375 MG/M3 (1000 PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 9750
LD50 (IPR-MOUSE)(G/KG) - 1297

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN HAS A DEFATTING EFFECT, CAUSING DRYING AND IRRITATION. OVEREXPOSURE TO VAPORS MAY CAUSE IRRITATION OF MUCOUS MEMBRANES, DRYNESS OF MOUTH AND THROAT, HEADACHE, NAUSEA AND DIZZINESS.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

CONTINUED ON PAGE: 3

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, SOURCES OF IGNITION

INCOMPATIBLES: SULFURIC ACID, NITRIC ACID, STRONG OXIDIZING AGENTS

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SUITABLE PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING, OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U002 (TOXIC WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 5000 PPM, A GAS MASK WITH ORGANIC VAPOR CANNISTER IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS WITH FULL FACE SHIELD IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, POLYVINYL ACETATE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

CONTINUED ON PAGE: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	ACETONE
HAZARD CLASS	FLAMMABLE LIQUID
UN/NA	UN1090
LABELS	FLAMMABLE LIQUID

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	ACETONE
HAZARD CLASS	3.1
UN/NA	UN1090
LABELS	FLAMMABLE LIQUID

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

-- LAST PAGE --

Ammonium Hydroxide

AMMONIUM HYDROXIDE
AMMONIUM HYDROXIDE
AMMONIUM HYDROXIDE

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 01/31/86
PO NBR: N/A
ACCT: 133918-01
INDEX: 02-8602-90422
CAT NO: A669C212

SUBSTANCE IDENTIFICATION

CAS-NUMBER 1336-21-6

SUBSTANCE: **AMMONIUM HYDROXIDE**

TRADE NAMES/SYNONYMS: AMMONIA AQUEOUS; AMMONIA SOLUTION; AQUA AMMONIA; AMMONIUM HYDRATE; WATER OF AMMONIA; UN 2672; A-669; A-669C; A-669-SI; A-669-S; A-667

CHEMICAL FAMILY:
INORGANIC BASE

MOLECULAR FORMULA: N-H5-O MOL WT: 35.06

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=0 REACTIVITY=0 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: AMMONIUM HYDROXIDE

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
50 PPM NIOSH RECOMMENDED CEILING FOR AMMONIA GAS,
25 PPM ACGIH TWA (FOR AMMONIA GAS)

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID WITH STRONG AMMONIA ODOR

MELTING POINT: -107 F (-77 C) SPECIFIC GRAVITY: 0.9

VAPOR PRESSURE: 420-475 MMHG AS NH3 SOLUBILITY IN WATER: COMPLETE

ODOR THRESHOLD: 50 PPM VAPOR DENSITY: 0.6

C01343

Ammonium Hydroxide

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD. NOT FLAMMABLE LIQUID (DOT); HOWEVER, THE AMMONIA GAS EVOLVED IS FLAMMABLE.

FLASH POINT: NONFLAMMABLE UPPER EXPLOSION LIMIT: 27% AS NH3

LOWER EXPLOSION LIMIT: 16% AS NH3 AUTOIGNITION TEMP.: 1204 F (AMMONIA)

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH USING AGENT INDICATED. USE FLOODING AMOUNTS OF WATER AS A FOG FROM AS FAR A DISTANCE AS POSSIBLE. USE WATER SPRAY TO ABSORB CORROSIVE VAPORS. AVOID BREATHING CORROSIVE VAPORS; KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

44 UG EYE-RABBIT SEVERE IRRITATION; 43 MG/KG ORAL-HUMAN LDLO; 5000 PPM INHALATION-HUMAN LCLO; 408 PPM INHALATION-HUMAN TCLO; 750 MG/KG ORAL-RAT LDLO; 350 MG/KG ORAL-RAT LD50; 10 MG/KG INTRAVENOUS-RABBIT LDLO; MUTAGENIC DATA (RTECS); CARCINOGEN STATUS: NONE.
AMMONIUM HYDROXIDE IS CORROSIVE TO THE EYES, SKIN, AND MUCOUS MEMBRANES.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CORROSIVE.
ACUTE EXPOSURE- MILD EXPOSURE MAY CAUSE IRRITATION OF THE NOSE, COUGHING, SNEEZING. SEVERE EXPOSURE MAY CAUSE RESPIRATORY IRRITATION, DYSPNEA, PULMONARY EDEMA, SHOCK, CONVULSIONS, CYANOSIS, RAPID AND WEAK PULSE AND CENTRAL NERVOUS SYSTEM DEPRESSION.

CHRONIC EXPOSURE- MAY CAUSE IRRITATION, BRONCHITIS, PNEUMONIA. SEE MICROORGANISM AND MUTAGENIC REFERENCES IN TOXICITY SECTION.

SKIN CONTACT:
CORROSIVE.
ACUTE EXPOSURE- MAY CAUSE SEVERE BURNING PAIN AND CORROSIVE DAMAGE.

CHRONIC EXPOSURE- MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER (APPROXIMATELY 15-20 MINUTES) UNTIL NO EVIDENCE OF CHEMICAL REMAINS. IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
CORROSIVE.
ACUTE EXPOSURE- MAY CAUSE REDNESS, IRRITATION, CHEMICAL BURNS, TEMPORARY BLINDNESS, AND ULCERATION.

CHRONIC EXPOSURE- IRRITATION, CATARACTS, AND RETINAL ATROPHY MAY OCCUR.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS. (APPROXIMATELY 15-20 MINUTES). IN PRESENCE OF BURNS, APPLY STERILE BANDAGE LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
CORROSIVE.
ACUTE EXPOSURE- MAY CAUSE EXCESSIVE SALIVATION, NAUSEA, VOMITING, GASTRIC IRRITATION AND, POSSIBLY, PERFORATION. SEVERE EXPOSURE MAY PRODUCE CENTRAL NERVOUS SYSTEM DEPRESSION, SHOCK, CONVULSIONS, AND PULMONARY EDEMA IF ASPIRATION OCCURS.

FIRST AID- IF VICTIM IS CONSCIOUS AND NOT CONVULSIVE, IMMEDIATELY GIVE LARGE QUANTITIES OF WATER TO DILUTE THE ALAKAL. DO NOT INDUCE VOMITING. GET MEDICLA ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
GENERALLY STABLE. MAY UNDERGO VIOLENT REACTION WITH INCOMPATIBLE SUBSTANCES.

INCOMPATIBILITIES:
AMMONIUM HYDROXIDE DECOMPOSES, RELEASING IRRITATING OR TOXIC GASES, WHEN HEATED.

DECOMPOSITION:
MAY PRODUCE CORROSIVE VAPORS OF AMMONIA AND TOXIC OXIDES OF NITROGEN.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****

CONDITIONS TO AVOID

FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. MAY IGNITE COMBUSTIBLES (WOOD, PAPER, OIL, ETC.).

****

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG A HOLDING AREA SUCH AS A PIT, POND OR LAGOON TO CONTAIN SPILL AND DIKE SURFACE FLOW USING BARRIER OF SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED

CONCRETE. ABSORB LIQUID MASS WITH FLY ASH OR CEMENT POWDER.

ADD DILUTE ACID TO NEUTRALIZE.

AIR SPILL:
KNOCK DOWN VAPORS WITH WATER SPRAY. KEEP UPWIND.

WATER SPILL:
ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION SYSTEM.

RESPIRATOR:
>300 PPM- SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
WEAR PROTECTIVE CLOTHING. PREVENT ANY POSSIBILITY OF CONTACT WITH LIQUID AND REPEATED OR PROLONGED VAPOR CONTACT WITH SKIN.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 05/02/85 REVISION DATE: 06/13/85

-ADDITIONAL INFORMATION-

Ammonium Hydroxide

J. T. BAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

A5916 -01 AMMONIUM HYDROXIDE PAGE: 1
EFFECTIVE: 10/24/85 ISSUED: 01/24/86

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: AMMONIUM HYDROXIDE
FORMULA: NH4OH
FORMULA WT: 35.05
CAS NO.: 01336-21-6
NIOSH/RTECS NO.: BD9625000
COMMON SYNONYMS: AMMONIA SOLUTION; AQUA AMMONIA
PRODUCT CODES: 4807,9730,9733,5330,9719,9729,5335,9721,9731,5019,9720,5138

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	- 3	(POISON)
FLAMMABILITY	- 1	
REACTIVITY	- 2	
CONTACT	- 3	(CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON. DANGER.
CAUSES BURNS.
VAPOR EXTREMELY IRRITATING.
MAY BE FATAL IF SWALLOWED.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
AMMONIUM HYDROXIDE	20-30	1336-21-6

SECTION III - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: N/A
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 0.90 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

CONTINUED ON PAGE: 2

SECTION III - PHYSICAL DATA (CONTINUED)

APPEARANCE & ODOR: CLEAR COLORLESS SOLUTION WITH A STRONG ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A NFPA 704M RATING: 3-1-0

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE

TOXIC GASES PRODUCED
AMMONIA

SECTION V - HEALTH HAZARD DATA

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 350

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
INHALATION OF VAPORS MAY CAUSE COUGHING, CHEST PAINS, DIFFICULTY BREATHING OR UNCONSCIOUSNESS.
INGESTION MAY CAUSE SEVERE BURNING TO MOUTH AND STOMACH.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

INCOMPATIBLES: STRONG ACIDS, FLUORINE

DECOMPOSITION PRODUCTS: AMMONIA

CONTINUED ON PAGE: 3

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. CAREFULLY NEUTRALIZE SPILL WITH DILUTE HCL. FLUSH AREA WITH FLOODING AMOUNTS OF WATER. (USE CAUTION.)

J. T. BAKER NEUTRACIT-2(R) CAUSTIC NEUTRALIZER IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP VAPOR AND MIST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, A CHEMICAL CARTRIDGE RESPIRATOR WITH AMMONIA/AMINE CARTRIDGE IS RECOMMENDED. IF CONCENTRATION EXCEEDS CAPACITY OF CARTRIDGE RESPIRATOR, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.
EYE/SKIN PROTECTION:	SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE STRIPE

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	AMMONIUM HYDROXIDE (12-44% AMMONIA)
HAZARD CLASS	CORROSIVE MATERIAL (LIQUID)
I.D./NA	NA2672
LABELS	CORROSIVE
REPORTABLE QUANTITY	1000 LBS.

CONTINUED ON PAGE: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

INTERNATIONAL (I.M.C.)

PROPER SHIPPING NAME	AMMONIA SOLUTIONS (10-35% AMMONIA)
HAZARD CLASS	8
UN/NA	UN2672
LABELS	CORROSIVE

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

-- LAST PAGE --

Argon

MG Industries™

2460 Boulevard Of The Generals
P.O. Box 945
Valley Forge, Pennsylvania 19482

EMERGENCY PHONE
800-345-6361
800-362-0534 (in PA)

MATERIAL SAFETY DATA SHEET

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PRODUCT NAME	CAS #
Argon	7440-37-1
TRADE NAME AND SYNONYMS	DOT I.D. No.:
Argon; Argon, compressed	UN 1006
CHEMICAL NAME AND SYNONYMS	DOT Hazard Class:
Argon	Nonflammable gas
	Formula:
	Ar
ISSUE DATE AND REVISIONS	Chemical Family:
25 November 1985	Rare gas

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT Argon is defined as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure which is equivalent to a partial pressure of 135 mm Hg (ACGIH, 1985-86).

SYMPTOMS OF EXPOSURE

Effects of exposure to high concentrations so as to displace the oxygen in air necessary for life may include any, all, or none of the following:

- o Loss of balance or dizziness
- o Tightness in the frontal area of the forehead
- o Tingling in the tongue, fingertips or toes

(Continued on last page.)

TOXICOLOGICAL PROPERTIES

Argon is nontoxic but the liberation of a large amount in a confined area could displace the amount of oxygen in air necessary to support life.

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO ARGON. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

None

PHYSICAL DATA

BOILING POINT -302.6°F (-185.9°C)	LIQUID DENSITY AT BOILING POINT 87 lb/ft^3 (1393 kg/m^3)
VAPOR PRESSURE @ 70°F (21.1°C): Above the critical temp. of -188.1°F (-122.3°C)	GAS DENSITY AT 70°F, 1 atm .1034 lb/ft^3 (1.656 kg/m^3)
SOLUBILITY IN WATER Very slightly	FREEZING POINT -308.9°F (-189.4°C)
EVAPORATION RATE N/A	SPECIFIC GRAVITY (AIR=1) 1.38
APPEARANCE AND ODOR Colorless, odorless gas	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMAGLE LIMITS % BY VOLUME LEL N/A UEL N/A
EXTINGUISHING MEDIA Nonflammable, inert gas		ELECTRICAL CLASSIFICATION Nonhazardous
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID
Unstable		
Stable	X	N/A

INCOMPATIBILITY (Materials to avoid)
None

HAZARDOUS DECOMPOSITION PRODUCTS
None

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID
May Occur		
Will Not Occur	X	N/A

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

WASTE DISPOSAL METHOD Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION See Local Exhaust on last page.	LOCAL EXHAUST See last page.	SPECIAL N/A
	MECHANICAL (Gen.) N/A	OTHER N/A

PROTECTIVE GLOVES
Any material

EYE PROTECTION
Safety goggles or glasses

OTHER PROTECTIVE EQUIPMENT
Safety shoes

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION
DOT Shipping Name: Argon or Argon, Compressed DOT Hazard Class: Nonflammable gas
DOT Shipping Label: Nonflammable gas I.D. No.: UN 1006

SPECIAL HANDLING RECOMMENDATIONS
Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

For additional recommendations, consult Compressed Gas Association's Pamphlets P-1, P-9, P-14, and Safety Bulletin SB-2.

SPECIAL STORAGE RECOMMENDATIONS
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130F (54C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

For additional recommendations, consult Compressed Gas Association's Pamphlets P-1, P-9, P-14, and Safety Bulletin SB-2.

SPECIAL PACKAGING RECOMMENDATIONS
Argon is noncorrosive and may be used with any common structural material.

OTHER RECOMMENDATIONS OR PRECAUTIONS
Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

SYMPTOMS OF EXPOSURE: (Continued)

- o Weakened speech leading to the inability to utter sounds
- o Rapid reduction in the ability to perform movements
- o Reduced consciousness of the surroundings
- o Loss of tactile sensations
- o Heightened mental activity

It should be recognized that it is possible that none of the above symptoms may occur in argon asphyxia so that there are no definite warning symptoms.

LOCAL EXHAUST: (Continued)

To prevent accumulation of high concentrations so as to reduce the oxygen level in the air to less than 18 molar percent.

PRODUCT: Argon, Compressed

DOT CLASS:Non-flammable gas

REQUIRED LABELS: Non-flammable gas

U.N. NO.: 1006 SYNONYMS:

AUTOIGNITION TEMP: N/A °F VAPOR DENSITY (AIR=1): 1.38

FLAMMABILITY LIMITS: Upper N/A Lower N/A

HAZARD ID: Health N/A Flammability N/A Reactivity N/A

FIRE OR EXPLOSION

May burn but does not ignite readily. Container may explode in heat of fire.

HEALTH HAZARDS

Vapors may cause dizziness or suffocation. Contact with liquid may cause frostbite. Fire may produce irritating or poisonous gases.

EMERGENCY ACTION

Keep unnecessary people away. Stay upwind, keep out of low areas. Isolate area and deny entry. Wear self contained breathing apparatus and full protective clothing. For EMERGENCY assistance call CHEMTREC (800) 424 9300.

FIRE — For small fires, use dry chemical or CO_2. For large fires, use water spray, fog or foam. Move container from fire area if you can do it without risk. Stay away from ends of tanks. Cool containers that are exposed to flames with water from the sides until well after fire is out.

SPILL OR LEAK — Stop leak of you can do it without risk.

FIRST AID — Move victim to fresh air, call emergency medical care. If not breathing, give artificial respiration. If breathing is difficult give oxygen.

Argon in Helium

MG Industries™

2460 Boulevard Of The Generals
P.O. Box 945
Valley Forge, Pennsylvania 19482

EMERGENCY PHONE
800-345-6361
800-362-0534 (in PA)

MATERIAL SAFETY DATA SHEET

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PRODUCT NAME	CAS #
Helium	7440-59-7
TRADE NAME AND SYNONYMS	DOT I.D. No.:
Helium	UN 1046
CHEMICAL NAME AND SYNONYMS	DOT Hazard Class:
Helium	Nonflammable gas
ISSUE DATE AND REVISIONS	Formula:
25 November 1985	He
	Chemical Family:
	Inert gas

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT

Helium is defined as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure which is equivalent to a partial pressure of 135 mm Hg (ACGIH, 1985-86).

SYMPTOMS OF EXPOSURE

Effects of exposure to high concentrations so as to displace the oxygen in the air necessary for life are headache, dizziness, labored breathing and eventual unconsciousness. Breathing mixtures of helium with adequate oxygen to support life modifies the voice sound so that it is higher "pitched."

TOXICOLOGICAL PROPERTIES

Helium is nontoxic but the liberation of a large amount in a confined area could displace the amount of oxygen in air necessary to support life.

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO HELIUM. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

None

PHYSICAL DATA

BOILING POINT -452.1°F (-268.9°C)	LIQUID DENSITY AT BOILING POINT 7.8 lb/ft^3 (125 kg/m^3)
VAPOR PRESSURE @ 70°F (21.1°C) Above the critical temp. of -450.3°F (-268°C)	GAS DENSITY AT 70°F, 1 atm .0103 lb/ft^3 (.1650 kg/m^3)
SOLUBILITY IN WATER Negligible	FREEZING POINT λ point = -456.5°F (-271.3°C)
EVAPORATION RATE N/A	SPECIFIC GRAVITY (AIR=1) = 70°F (21.1°C) = .138
APPEARANCE AND ODOR Colorless, odorless gas	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMAGLE LIMITS % BY VOLUME LEL N/A UEL N/A
EXTINGUISHING MEDIA Nonflammable, inert gas		ELECTRICAL CLASSIFICATION Nonhazardous

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID N/A
Stable	X	

INCOMPATIBILITY (Materials to avoid)
None

HAZARDOUS DECOMPOSITION PRODUCTS
None

HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID N/A
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

WASTE DISPOSAL METHOD Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION See Local Exhaust on last page.	LOCAL EXHAUST See last page.	SPECIAL N/A
	MECHANICAL (Gen.) N/A	OTHER N/A
PROTECTIVE GLOVES Any material		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION

DOT Shipping Name: Helium or Helium, Compressed DOT Hazard Class: Nonflammable gas
DOT Shipping Label: Nonflammable gas I.D. No.: UN 1046

SPECIAL HANDLING RECOMMENDATIONS

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

For additional handling recommendations, consult Compressed Gas Association's Pamphlets P-1, P-9, P-14 and Safety Bulletin SB-2.

SPECIAL STORAGE RECOMMENDATIONS

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130F (54C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-9, P-14 and Safety Bulletin SB-2.

SPECIAL PACKAGING RECOMMENDATIONS

Helium is noncorrosive and may be used with any common structural material.

OTHER RECOMMENDATIONS OR PRECAUTIONS

Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review those regulations to ensure that he is in full compliance.

LOCAL EXHAUST: (Continued)

To prevent accumulation of high concentrations so as to reduce the oxygen level in the air to less than 18 molar percent.

PRODUCT: Helium

DOT CLASS: Non-flammable gas

REQUIRED LABELS: Non-flammable gas

U.N. NO.: 1046 SYNONYMS:

AUTOIGNITION TEMP: N/A °F VAPOR DENSITY (AIR=1): 0.137

FLAMMABILITY LIMITS: Upper N/A Lower N/A

HAZARD ID: Health N/A Flammability N/A Reactivity N/A

FIRE OR EXPLOSION

May burn but does not ignite readily. Container may explode in heat of fire.

HEALTH HAZARDS

Vapors may cause dizziness or suffocation. Contact with liquid may cause frostbite. Fire may produce irritating or poisonous gases.

EMERGENCY ACTION

Keep unnecessary people away. Stay upwind, keep out of low areas. Isolate area and deny entry. Wear self contained breathing apparatus and full protective clothing. For EMERGENCY assistance call CHEMTREC (800) 424 9300.

FIRE — For small fires, use dry chemical or CO_2. For large fires, use water spray, fog or foam. Move container from fire area if you can do it without risk. Stay away from ends of tanks. Cool containers that are exposed to flames with water from the sides until well after fire is out.

SPILL OR LEAK — Stop leak of you can do it without risk.

FIRST AID — Move victim to fresh air, call emergency medical care. If not breathing, give artificial respiration. If breathing is difficult give oxygen.

Carbon Tetrachloride

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FFFFFFFFFF   III     SSSSSS   HH    HH   EEEEEEE   RRRRR
FFFFFFFFFF   III   SS     SS  HH    HH   EEEEEEE   RR  RR
FFF          III    SS        HH    HH   EE        RR   RR
FFFFFFFF     III      SS      HHHHHHHH   EEEEEEE   RRRRR
FFFFFFFF     III        SS    HHHHHHHH   EEEEEEE   RRRR
FFF          III        SS    HH    HH   EE        RR RR
FFF          III   SS    SS   HH    HH   EEEEEEE   RR  RR
FFF          III     SSSSS    HH    HH   EEEEEEE   RR   RR

          MM   MM     SSSSS   DDDDDD      SSSSS
          MMM MMM   SS        DD   DD   SS
          MM M MM     SSS     DD   DD     SSS
          MM   MM        SS   DD   DD        SS
          MM   MM   SSSSS     DDDDDD      SSSSS
```

IMPORTANT SAFETY INFORMATION -- DO NOT DISCARD.

PLEASE ROUTE TO COMPANY SAFETY OFFICER.

FISHER SCIENTIFIC HAS A COMPLETE LINE OF SAFETY PRODUCTS AND INFORMATION FOR THE LABORATORY. CONTACT YOUR LOCAL FISHER BRANCH FOR FILMS, BROCHURES, CATALOGS AND PRODUCTS.

CERRO COPPER & BRASS CO
HGWY 3 ALTON & SRN TRACKS
SAUGET ILL 62004
P P E ST LOUIS ILL 62202

C01347

IF NAME AND/OR ADDRESS HAVE CHANGED, CONTACT YOUR FISHER SALES REPRESENTATIVE OR YOUR LOCAL FISHER BRANCH.

REQUIRED MATERIAL SAFETY DATA SHEETS (MSDS) NOT INCLUDED IN THIS MAILING WILL FOLLOW UNDER SEPARATE COVER.
THIS PACKET MAY CONTAIN MSDS FOR PRODUCTS MANUFACTURED BY OTHERS AND DISTRIBUTED BY FISHER SCIENTIFIC COMPANY. THESE MSDS WERE PREPARED BY THE MANUFACTURER AND FISHER DISCLAIMS ALL LIABILITY FOR THE CONTENT.

Carbon Tetrachloride

CARBON TETRACHLORIDE
CARBON TETRACHLORIDE
CARBON TETRACHLORIDE

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 12/21/85
PO NBR: 66420
ACCT: 133918-01
INDEX: 02-8535-00327
CAT NO: C1991

SUBSTANCE IDENTIFICATION

CAS-NUMBER 56-23-5

SUBSTANCE: **CARBON TETRACHLORIDE**

TRADE NAMES/SYNONYMS: TETRACHLOROMETHANE; PERCHLOROMETHANE; CARBON CHLORIDE; TETRACHLOROCARBON; METHANE TETRACHLORIDE; CARBON TET; FREON 10; HALON 104; BENZINOFORM; UN 1846

CHEMICAL FAMILY:
HALOGEN COMPOUND, ALIPHATIC

MOLECULAR FORMULA: C-CL4 MOL WT: 154

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: CARBON TETRACHLORIDE

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
10 PPM OSHA TWA; 25 PPM OSHA CEILING; 200 PPM OSHA 5 MINUTE/4 HR PEAK;
2 PPM NIOSH RECOMMENDED 1 HR CEILING;
5 PPM (30 MG/M3) ACGIH TWA (SKIN); 20 PPM (125 MG/M3) ACGIH STEL (SKIN) (NOTICE OF INTENDED CHANGE 1984-1985)

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID WITH AN ETHEREAL ODOR.

BOILING POINT: 172 F (78 C) MELTING POINT: -9 F (-23 C)

SPECIFIC GRAVITY: 1.6 VAPOR PRESSURE: 91.3 MMHG @ 20 C

EVAPORATION RATE: (BU AC=1) .078 TTE SOLUBILITY IN WATER: 0.08%

SOLVENT SOLUBILITY: ALC, ETHER, CHLOROFORM, BZ, PETR NAPHTHA, CS2

ODOR THRESHOLD: 50 PPM VAPOR DENSITY: 5.3

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND NEGLIGIBLE EXPLOSION HAZARD UNDER NORMAL CONDITIONS.

FLASH POINT: NONFLAMMABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. FIGHT FIRE FROM MAXIMUM DISTANCE. DIKE FIRE CONTROL WATER FOR LATER DISPOSAL. DO NOT SCATTER MATERIAL (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

USE SUITABLE AGENT FOR SURROUNDING FIRE. AVOID BREATHING VAPORS OR DUSTS, KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

1000 PPM INHALATION-HUMAN LCLO; 20 PPM INHALATION-HUMAN TCLO; 43 MG/KG ORAL-HUMAN LDLO; 2800 MG/KG ORAL-RAT LD50; 5070 MG/KG SKIN-RAT LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS); SUSPECT HUMAN CARCINOGEN (IARC, NTP). CARBON TETRACHLORIDE IS A SUSPECT LEUKOMOGEN AND A SUSPECT LIVER AND RESPIRATORY CARCINOGEN.

CARBON TETRACHLORIDE IS A SKIN IRRITANT, CENTRAL NERVOUS SYSTEM DEPRESSANT, NEPHROTOXIN, AND HEPATOTOXIN. CONSUMPTION OF ALCOHOL INCREASES THE SYSTEMIC TOXICITY. PERSONS WITH A HISTORY OF LIVER, KIDNEY, CENTRAL NERVOUS SYSTEM DISEASE, OR ALCOHOLISM MAY BE AT AN INCREASED RISK FROM EXPOSURE.

HEALTH EFFECTS AND FIRST AID

INHALATION:
NARCOTIC/NEPHROTOXIC/HEPATOTOXIC. 300 PPM IMMEDIATELY DANGEROUS TO LIFE/HEALTH

ACUTE EXPOSURE- ABOVE 10 PPM, NASAL AND RESPIRATORY IRRITATION MAY OCCUR. POISONING CAUSES IMMEDIATE NAUSEA, VOMITING, & ABDOMINAL PAIN, WITH CYANOSIS, HEADACHE, DIZZINESS, CONFUSION, DROWSINESS, DYSPNEA, HYPOTENSION, AND POSSIBLY CONVULSIONS HAVE. VISUAL DISTURBANCES, SUCH AS BLURRED VISION, OPTIC NEURITIS, TOXIC AMBLYOPIA, AND OPTIC OPTIC ATROPHY ARE POSSIBLE. INTOXICATION MAY PROGRESS TO CENTRAL NERVOUS SYSTEM DEPRESSION, WITH UNCONSCIOUSNESS, COMA, AND POSSIBLY DEATH FROM RESPIRATORY ARREST, CIRCULATORY COLLAPSE, OR VENTRICULLAR FIBRILLATION. IF DEATH IS NOT IMMEDIATE, AN ASYMPTOMATIC PERIOD, OR

THE ABOVE SYMPTOMS, MAY BE FOLLOWED IN 1-2 DAYS BY LIVER, OR MORE LIKELY, KIDNEY DAMAGE, WITH OLIGURIA, ALBUMINURIA, PROTEINURIA, UREMIA, ANURIA, EDEMA AND WEIGHT GAIN. ANOREXIA, JAUNDICE, AND HEPATOMEGALY INDICATE LIVER DAMAGE. SPASMS OF THE HANDS AND FEET OCCUR RARELY.

CHRONIC EXPOSURE- FATIGUE, ANOREXIA, WEIGHT LOSS, VOMITING, ABDOMINAL PAIN, ANEMIA, WEAKNESS, NAUSEA, BLURRED VISION, AMNESIA, PARESTHESIAS, TREMORS, AND LOSS OF PERIPHERAL COLOR VISION INDICATE CHRONIC POISONING. CASE REPORTS HAVE DESCRIBED LIVER TUMORS ASSOCIATED WITH CIRRHOSIS IN CARBON TETRACHLORIDE-EXPOSED HUMANS. A MORTALITY STUDY OF LAUNDRY AND DRY-CLEANING WORKERS EXPOSED TO A VARIETY OF SOLVENTS SUGGESTS AN EXCESS OF RESPIRATORY CANCERS, LIVER TUMORS, AND LEUKEMIA. SEE HUMAN CARCINOGENIC AND ANIMAL MUTAGENIC, REPRODUCTIVE EFFECTS, AND TUMORIGENIC REFERENCES IN TOXICITY SECTION.

FIRST AID- REMOVE FROM EXPOSURE. GIVE ARTIFICIAL RESPIRATION UNTIL CONSCIOUSNESS RETURNS. (DREISBACH, HANDBOOK OF POISONING, 11TH ED.) DO NOT GIVE EPINEPHRINE (ADRENALIN) OR OTHER STIMULANTS. GIVE OXYGEN IF THE SKIN IS BLUE OR IF THERE IS DIFFICULTY WITH BREATHING.

SKIN CONTACT:
IRRITANT/NARCOTIC/NEPHROTOXIC/HEPATOTOXIC.
ACUTE EXPOSURE- CONTACT WITH THE LIQUID MAY CAUSE MILD IRRITATION. MAY BE ABSORBED, CAUSING SYMPTOMS AS IN ACUTE INHALATION POISONING, WITH COMA, OLIGURIA, AND JAUNDICE.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT DEFATS THE SKIN, CAUSING IRRITATION AND DERMATITIS. ABSORPTION MAY PRODUCE SYSTEMIC EFFECTS AS IN CHRONIC INHALATION POISONING. SEE HUMAN CARCINOGENIC AND ANIMAL MUTAGENIC, REPRODUCTIVE EFFECTS AND TUMORIGENIC DATA REFERENCES IN TOXICITY SECTION.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

ACUTE EXPOSURE- CONTACT WITH LIQUID OR VAPOR MAY CAUSE PAIN AND MINOR CONJUNCTIVAL INJURY.

CHRONIC EXPOSURE- EXPOSURE HAS CAUSED DIMINISHED VISUAL ACUITY AND COLOR VISION LOSS FOLLOWING INHALATION OR SKIN ABSORPTION. VAPOR IS STRONGLY SUSPECTED OF CAUSING RETROBULBAR NEURITIS, OPTIC NEURITIS AND OPTIC ATROPHY.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
NARCOTIC/NEPHROTOXIC/HEPATOTOXIC.
ACUTE EXPOSURE- TOXIC AMOUNTS WILL RESULT IN SYMPTOMS AS IN ACUTE INHALATION

POISONING, WITH HEMATEMESIS AND DIARRHEA. THE ESTIMATED FATAL DOSE IN HEALTHY ADULTS IS 5-10 ML, BUT AS LITTLE AS 1 ML MAY BE FATAL IN CHILDREN OR IN ADULTS WITH PREVICUS MEDICAL PROBLEM.

FIRST AID- GET MEDICAL ATTENTION IMMEDIATELY. IF MEDICAL ATTENTION IS NOT IMMEDIATELY AVAILABLE, AND IF VICTIM IS CONSCIOUS, ATTEMPT TO INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GIVE OXYGEN IF THE SKIN IS BLUE OR IF THERE IS DIFFICULTY IN BREATHING.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
TRISILANE: EXPLODES IN AIR ON CONTACT.
TETRAETHYLENEPENTAMINE: EXPLOSION.
TETRASILANE + OXYGEN: EXPLOSION.
TRIETHYLDIALUMINUM SESQUICHLORIDES: DARKENED AND EXPLODED AT ROOM TEMPERATURE.
ETHYLENE: EXPLOSION WHEN UNDER HIGH PRESSURE IN PRESENCE OF ORGANIC PEROXIDE CATALYSTS.
BURNING WAX: EXPLOSION.
ALUMINUM POWDER: EXPLOSIVE ON HEATING OR IMPACT.
CALCIUM HYPOCHLORITE: EXPLOSION ON HEATING.
DINITROGEN TETRAOXIDE: EXPLOSION BY SHOCK OR HEATING TO 150 C.
CHLORINE TRIFLUORIDE: PROBABLE EXPLOSION.
DISILANE: PROBABLE EXPLOSION.
CALCIUM DISILICATE: POSSIBLE EXPLOSION ON IMPACT.
METALS: POSSIBLE EXPLOSION ON HEATING OR IMPACT.
ALLYL ALCOHOL: FORMS EXPLOSIVE DI- AND TRICHLOROBUTYLENE EPOXIDES.
DECABORANE: FORMS IMPACT-SENSITIVE EXPLOSIVE COMPOUND .
POTASSIUM AND ITS ALLOYS: FORMS EXPLOSIVE MIXTURE.
LIQUID OXYGEN: VIOLENT REACTION OR MILD EXPLOSION WHEN IGNITED.
PLUTONIUM: IGNITION OR POSSIBLE EXPLOSION.
POTASSIUM TERT-BUTOXIDE: IGNITION.
BROMINE TRIFLUORIDE: IGNITION.
SILVER PERCHLORATE: REACTS IN PRESENCE OF HYDROGEN CHLORIDE TO PRODUCE TRICHLOROMETHYL PERCHLORATE WHICH DETONATES AT 40 C.
FINELY DIVIDED BARIUM: VIOLENT REACTION OR POSSIBLE EXPLOSION.
ETHYLENE WITH BENZOYL PEROXIDE: EXPLOSION.
BURNING DIBORANE: VIOLENT EXPLOSION.
LITHIUM: VIOLENT EXPLOSION.
FLUORINE: VIOLENT REACTION OR POSSIBLE EXPLOSION.
MAGNESIUM: EXPLOSION.
SODIUM: VIOLENT REACTION WHEN HOT OR EXPLOSION ON IMPACT.
SODIUM-POTASSIUM ALLOY: VIOLENT EXPLOSION ON LIGHT IMPACT.
BURNING URANIUM: EXPLOSION.
ZIRCONIUM: EXPLOSION.
CALCIUM DISILICATE: POSSIBLE EXPLOSION BY IMPACT.
DIMETHYL FORMAMIDE: VIOLENT REACTION IN PRESENCE OF IRON OR AT TEMPERATURES ABOVE 65 C.
BERYLLIUM POWDER: FLASH OR SPARK ON HEAVY IMPACT.
HEXACHLOROCYCLOHEXANE: POSSIBLE VIOLENT REACTION IN PRESENCE OF IRON.
DIMETHYLACETAMIDE: EXOTHERMIC REACTION WITH INCREASE IN PRESSURE OR VIGOROUS REACTION IN PRESENCE OF IRON.

DECOMPOSITION:
LIGHTED CIGARETTES OR FLAMES OR CONTACT WITH HOT COMMON METALS CAUSES DECOMPOSITION AND THE EMISSION OF TOXIC PHOSGENE, TOXIC AND REACTIVE CHLORINE, AND HYDROGEN CHLORIDE.

POLYMERIZATION:
DOES NOT POLYMERIZE.

****
CONDITIONS TO AVOID

CONTAINERS MAY EXPLODE IN HEAT OF FIRE.

****
SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS.

IMMOBILIZE SPILL WITH UNIVERSAL GELLING AGENT.

AIR SPILL:
KNOCK DOWN VAPORS WITH WATER SPRAY. KEEP UPWIND.

WATER USED TO KNOCK DOWN VAPORS MAY BECOME CORROSIVE OR TOXIC AND SHOULD BE CONTAINED PROPERLY FOR LATER DISPOSAL.

MAY EMIT TOXIC PHOSGENE UNDER FIRE CONDITIONS.

WATER SPILL:
TRAP SPILLED MATERIAL AT BOTTOM IN DEEP WATER POCKETS, EXCAVATED HOLDING AREAS OR WITHIN SAND BAG BARRIERS.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

USE ACTIVATED CARBON TO ABSORB SPILLED SUBSTANCE THAT IS DISSOLVED.

USE DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH A CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINERS AND CLOSE TIGHT. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZAED AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE PROCESS ENCLOSURE OR LOCAL EXHAUST VENTILATION TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:
100 PPM- SUPPLIED-AIR RESPIRATOR.
SELF-CONTAINED BREATHING APPARATUS.

300 PPM- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE OR USE EQUIVALENT RESPIRATOR.

ESCAPE- SELF-CONTAINED BREATHING APPARATUS.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 06/03/85 REVISION DATE: 11/14/85

-ADDITIONAL INFORMATION-

Hydrochloric Acid

HYDROCHLORIC ACID, 36-37%
HYDROCHLORIC ACID, 36-37%
HYDROCHLORIC ACID, 36-37%

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 01/31/86
PO NBR: N/A
ACCT: 133918-01
INDEX: 02-8602-90422
CAT NO: A144C212

SUBSTANCE IDENTIFICATION

CAS-NUMBER 7647-01-0

SUBSTANCE: **HYDROCHLORIC ACID, 36-37%**

TRADE NAMES/SYNONYMS: CHLOROHYDRIC ACID; HYDROCHLORIDE; MURIATIC ACID; SPIRITS OF SALT; UN 1789

CHEMICAL FAMILY:
INORGANIC ACID

MOLECULAR FORMULA: H-CL MOL WT: 36.46

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

PERCENT: 36-37 COMPONENT: HYDROGEN CHLORIDE
CAS 7647-01-0

PERCENT: 63-64 COMPONENT: WATER

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
5 PPM OSHA CEILING; 5 PPM ACGIH CEILING

PHYSICAL DATA

DESCRIPTION: COLORLESS OR SLIGHTLY YELLOW FUMING LIQUID WITH A PUNGENT ODOR

BOILING POINT: 384 F (196 C) SPECIFIC GRAVITY: 1.2

VAPOR PRESSURE: NOT AVAILABLE PH: 1.1 (0.1 N)

C01348

Hydrochloric Acid

SOLUBILITY IN WATER: SOLUBLE-EVOLVES HEAT VAPOR DENSITY: 1.3

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-COMBUSTIBLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH USING AGENTS SUITABLE FOR TYPE OF FIRE. USE FLOODING AMOUNTS OF WATER AS FOG. DO NOT SPRAY WATER DIRECTLY ON HYDROCHLORIC ACID. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS, KEEP UPWIND. (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

1300 PPM/30 MINUTES INHALATION-HUMAN LCLO; 81 MG/KG UNKNOWN-MAN LDLO; 3124 PPM/1 HOUR INHALATION-RAT LC50; 2124 PPM/30 MINUTES INHALATION-MOUSE LC50; 900 MG/KG ORAL-RABBIT LD50; 40 MG/KG INTRAPERITONEAL-MOUSE LD50; MUTAGENIC DATA (RTECS); CARCINOGEN STATUS: NONE.
HYDROCHLORIC ACID IS A SEVERE EYE, MUCOUS MEMBRANE, AND SKIN IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CORROSIVE. 100 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- EXPOSURE TO GAS OR FUMES MAY CAUSE IMMEDIATE COUGHING, BURNING OF THE THROAT OR NOSE, CHOKING, DIZZINESS, WEAKNESS AND DIFFICULTY SWALLOWING. EXPOSURE ABOVE 5 PPM MAY BE FOLLOWED BY INFLAMMATION AND OCCASIONAL ULCERATION OF THE NOSE, THROAT OR LARYNX; LARYNGITIS, BRONCHITIS, PNEUMONIA, HEADACHE, PALPITATIONS, DENTAL EROSION, OR NASAL SEPTUM PERFORATION. CONCENTRATIONS ABOVE 50 PPM MAY BE FOLLOWED BY BLEEDING OF THE NOSE AND GUMS. FOLLOWING A 6-8 HOUR LATENCY PERIOD, LARYNGEAL SPASM OR PULMONARY EDEMA WITH TIGHTNESS IN THE CHEST, AIR HUNGER, DIZZINESS, FROTHY SPUTUM AND CYANOSIS MAY OCCUR. SHORTNESS OF BREATH AND EXPECTORATION OF BLOOD MAY OCCUR FOR SEVERAL WEEKS FOLLOWING A SINGLE EXPOSURE. PYLORIC OBSTRUCTION MAY DEVELOP. SEVERE EXPOSURE MAY CAUSE CIRCULATORY SHOCK, ASPHYXIATION, GASTRIC HEMORRHAGE, INFECTION, CYANOSIS AND DEATH.

CHRONIC EXPOSURE- MAY CAUSE EROSION OF TEETH FOLLOWED BY JAW NECROSIS,

BRONCHIAL IRRITATION WITH CHRONIC COUGH, FREQUENT ATTACKS OF BRONCHIAL PNEUMONIA, SKIN TENDERNESS, GASTROINTESTINAL DISTURBANCES OR MUCOUS MEMBRANE IRRITATION WHICH MAY MIMIC VIRAL INFECTION OF THE UPPER RESPIRATORY TRACT CHARACTERIZED BY FEVER AND MUSCLE TENDERNESS. SEE ANIMAL MUTAGENIC REFERENCES IN TOXICITY SECTION.

FIRST AID: REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
CORROSIVE.

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE SEVERE PAIN AND BROWNISH OR YELLOW STAINS. BURNS MAY BE DEEP WITH SHARP EDGES AND HEAL SLOWLY WITH SCAR TISSUE FORMATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO LOW LEVELS MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES, DIRECTING A STREAM OF WATER UNDER CLOTHING WHILE IT IS BEING REMOVED. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). IN CASE OF BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION.

EYE CONTACT:
CORROSIVE.

ACUTE EXPOSURE- VAPORS WHICH ESCAPE FROM THE AQUEOUS SOLUTION ARE IMMEDIATELY IRRITATING TO THE EYES. THE SUBSTANCE IS SO IRRITATING THAT HUMANS HAVE RARELY SUBMITTED TO DAMAGING CONCENTRATIONS. HOWEVER, IN ANIMALS, 1350 PPM IN AIR FOR 1.5 HOURS HAS CAUSED CLOUDING OF THE CORNEA AND 300 PPM FOR 6 HOURS HAS CAUSED SLIGHT EROSION OF THE CORNEAL EPITHELIUM. CONTACT WITH THE LIQUID MAY CAUSE CONJUNCTIVAL FLUID BUILD-UP (EDEMA) AND CORNEAL DESTRUCTION WITH PAIN, LACRIMATION, BLURRED VISION AND PHOTOSENSITIZATION. SEVERITY OF DAMAGE DEPENDS ON THE QUANTITIY, CONCENTRATION AND DURATION OF CONTACT. IN HUMANS THE EFFECTS HAVE RANGED FROM REDNESS AND IRRITATION OF THE CONJUNCTIVA TO TOTAL CORNEAL OPACIFICATION AND LOSS OF THE EYE. RARELY, LENS OPACITY MAY OCCUR. MOST COMMONLY, A DROP OF THE LIQUID SPLASHED IN THE EYE AND IMMEDIATELY WASHED OUT WITH WATER MAY CAUSE WHITE COAGULATION OF THE CORNEAL AND CONJUNCTIVAL EPITHELIUM. CORNEAL SLOUGHING MAY OCCUR WITHIN A FEW DAYS AND THE EYE RETURNS TO NORMAL. 2% AQUEOUS SOLUTION OF HYDROCHLORIC ACID HAS BEEN APPLIED TO HUMAN EYES FOR A FEW SECONDS WITHOUT SIGNIFICANT INJURY. THE LIQUID IS INJURIOUS TO RABBIT CORNEAS AT PH LESS THAN 3. SOLUTIONS OF 0.25 N TO 1 N HAVE CAUSED SCARRING OF RABBIT CORNEAS.

CHRONIC EXPOSURE- PROLONGED VAPOR CONTACT MAY CAUSE CONJUNCTIVITIS. 100 PPM FOR SIX HOURS DAILY FOR FIFTY DAYS CAUSED SLIGHT UNREST AND EYE IRRITATION BUT NO INJURY IN RABBITS. THE LIQUID MAY CAUSE CORNEAL DAMAGE AND SCARRING.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF BURNS, APPLY STERILE BANDAGES LOOSELY

WITHOUT MEDICATION. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
CORROSIVE.
ACUTE EXPOSURE- MAY CAUSE BURNS OF MOUTH, ESOPHAGUS, AND STOMACH WITH CONSEQUENT PAIN, NAUSEA, SALIVATION, VOMITING, CHILLS, SHOCK AND THIRST. MAY CAUSE ULCERATION OF ALL MEMBRANES AND TISSUES WHICH THE ACID CONTACTS. ASPHYXIA OR NEPHRITIS MAY OCCUR. AFTER INITIAL RECOVERY, FEVER MAY INDICATE PERFORATION OF THE ESOPHAGUS OR STOMACH. IN SEVERE CASES, CIRCULATORY COLLAPSE MAY OCCUR WHICH, IF NOT CORRECTED, MAY LEAD TO RENAL, LIVER OR HEART FAILURE.

FIRST AID- IF VICTIM IS CONSCIOUS AND NOT CONVULSIVE GIVE HIM LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ACID. DO NOT INDUCE VOMITING. IF RESPIRATION IS DEPRESSED, GIVE OXYGEN. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES. FORMS DENSE, CHOKING FUMES ON EXPOSURE TO AIR.

INCOMPATIBILITIES:

ALCOHOLIC HYDROGEN CYANIDE: EXPLOSIVE REACTION.
TETRASELENIUM TETRANITRIDE: EXPLOSIVE REACTION.
SODIUM: EXPLOSIVE REACTION.
POTASSIUM PERMANGANATE: EXPLOSIVE REACTION.
SULFURIC ACID: EXPLOSIVE REACTION.
PERCHLORIC ACID: VIOLENT REACTION.
ACETIC ANHYDRIDE, 2-AMINOETHANOL, 28% AMMONIA, CHLOROSULFONIC ACID, ETHYLENEDIAMINE, ETHYLENEIMINE, OLEUM, PROPIOLACTONE (BETA-), PROPYLENE OXIDE, SODIUM HYDROXIDE OR VINYL ACETATE: INCREASED TEMPERATURE AND PRESSURE IN A CLOSED CONTAINER.
FLUORINE: IGNITES.
CESIUM CARBIDE: IGNITES.
CESIUM ACETYLIDE: IGNITES.
RUBIDIUM CARBIDE: IGNITES.
RUBIDIUM ACETYLIDE: IGNITES.
URANIUM DICARBIDE: IGNITES.
OXYGEN + PLATINUM: IGNITES.
LITHIUM SILICIDE: INCANDESCENCE.
ALUMINUM: VIGOROUS EXOTHERMIC REACTION.
CALCIUM PHOSPHIDE: VIGOROUS EXOTHERMIC REACTION.
URANIUM PHOSPHIDE: PRODUCES EXPLOSIVE OR FLAMMABLE PHOSPHINE.
SILVER PERCHLORATE + CARBON TETRACHLORIDE: PRODUCES EXPLOSIVE OR FLAMMABLE TRICHLOROMETHYL PERCHLORATE.
METALS: PRODUCES EXPLOSIVE OR FLAMMABLE HYDROGEN GAS.
MAGNESIUM BORIDE: PRODUCES EXPLOSIVE OR FLAMMABLE PRODUCT.
DOWICIL 100: DECOMPOSES DOWICIL 100.
WATER: EXOTHERMIC REACTION GENERATING FUMES OF HYDROGEN CHLORIDE.

DECOMPOSITION:
HEATING RELEASES INCREASING AMOUNTS OF HYDROGEN CHLORIDE.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

CONDITIONS TO AVOID

CONTACT WITH OR STORAGE WITH INCOMPATIBLE MATERIALS LISTED ABOVE AND EXCESSIVE HEAT.

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS.

NEUTRALIZE SPILL WITH SLAKED LIME, SODIUM BICARBONATE OR CRUSHED LIMESTONE.

AIR SPILL:
KNOCK DOWN VAPORS WITH WATER SPRAY. KEEP UPWIND.

WATER USED TO KNOCK DOWN VAPORS MAY BECOME CORROSIVE OR TOXIC AND SHOULD BE CONTAINED PROPERLY FOR LATER DISPOSAL.

WATER SPILL:
NEUTRALIZE WITH AGRICULTURAL LIME, SLAKED LIME, CRUSHED LIMESTONE, OR SODIUM BICARBONATE.

OCCUPATIONAL SPILL:
BE SURE TO WEAR PROTECTIVE EQUIPMENT BEFORE ENTERIMG SPILL AREA OR APPROACHING SPILL. SEE PROTECTIVE EQUIPMENT SECTION. HYDROCHLORIC ACID IN CONTACT WITH SOME INCOMPATIBLE MATERIALS MAY RELEASE FLAMMABLE AND/OR EXPLOSIVE REACTION PRODUCTS. SEE INFORMATION IN REACTIVITY SECTION.

DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE AS CLOSE TO THE SOURCE OF THE SPILL AS IS PRACTICAL AND EFFECTIVE, IN ORDER TO REDUCE THE AREA CONTAMINATED AND THE AMOUNT OF MATERIAL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION OR GENERAL DILUTION VENTILATION TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:
EXPOSURE LIMIT TO 50 PPM(HCL)-CHEMICAL CARTRIDGE RESPIRATOR WITH AN ACID GAS CARTRIDGE.

SUPPLIED-AIR RESPIRATOR.
SELF-CONTAINED BREATHING APPARATUS.

100 PPM (HCL)- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE, OR USE EQUIVILANT RESPIRATOR.

ESCAPE- GAS MASK WITH AN ACID GAS FILTER.
SELF-CONTAINED BREATHING APPARATUS.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-PROOF SAFETY GOGGLES TO PREVENT THIS SUBSTANCE FROM CONTACTING THE EYES. DO NOT WEAR CONTACT LENSES WHEN WORKING WITH CHEMICALS.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 07/01/85 REVISION DATE: 07/09/85

-ADDITIONAL INFORMATION-

Hydrochloric Acid

J. T. BAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
MATERIAL SAFETY DATA SHEET
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

EFFECTIVE: 10/06/85 ISSUED: 01/24/86

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: HYDROCHLORIC ACID
FORMULA: HCL
FORMULA WT: 36.46
CAS NO.: 07647-01-0
NIOSH/RTECS NO.: MW4025000
COMMON SYNONYMS: MURIATIC ACID; CHLORHYDRIC ACID; HYDROCHLORIDE
PRODUCT CODES: 9543,9539,9535,9367,9534,9544,9529,9542,4200,9549,9530,9548 9540,9547,9546,9537

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 3 (POISON)
FLAMMABILITY - 0
REACTIVITY - 2
CONTACT - 3 (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
CAUSES SEVERE BURNS
MAY BE FATAL IF SWALLOWED
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
HYDROCHLORIC ACID	35-40	7647-01-0

SECTION III - PHYSICAL DATA

BOILING POINT: 110 C (230 F) VAPOR PRESSURE(MM HG): 212

MELTING POINT: N/A VAPOR DENSITY(AIR=1): 1.3

SPECIFIC GRAVITY: 1.19 (H2O=1) EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

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SECTION III - PHYSICAL DATA (CONTINUED)

APPEARANCE & ODOR: CLEAR, COLORLESS OR SLIGHTLY YELLOW FUMING LIQUID.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A NFPA 704M RATING: 3-0-0

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED (POSITIVE PRESSURE IF AVAILABLE) BREATHING APPARATUS WITH FULL FACEPIECE. MOVE EXPOSED CONTAINERS FROM FIRE AREA, IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE EXPOSED CONTAINERS COOL; DO NOT GET WATER INSIDE CONTAINERS.

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE

SECTION V - HEALTH HAZARD DATA

TOXICITY:	LC50 (INHL-RAT-1H) (PPM)	- 3124
	LD50 (IPR-MOUSE)(MG/KG)	- 40
	LD50 (ORAL-RABBIT)(MG/KG)	- 900

EFFECTS OF OVEREXPOSURE
LIQUID MAY CAUSE SEVERE BURNS TO SKIN AND EYES.
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM
INHALATION OF VAPORS MAY CAUSE COUGHING AND DIFFICULT BREATHING.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FO AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, MOISTURE

INCOMPATIBLES: MOST COMMON METALS, WATER, STRONG BASES, AMINES, CARBONATES, METAL OXIDES

CONTINUED ON PAGE: 3

SECTION VI - REACTIVITY DATA (CONTINUED)

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STO LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WIT SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

J. T. BAKER NEUTRASORB(R) OR NEUTRASOL(R) "LOW NA+" ACID NEUTRALIZERS ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002 (CORROSIVE WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP VAPOR AND MIST LEVELS AS LOW AS POSSIBLE.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE IS RECOMMENDED. IF CONCENTRATION EXCEEDS CAPACITY OF CARTRIDGE RESPIRATOR, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, ACID-RESISTANT GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA. DO NOT STORE NEAR OXIDIZING MATERIALS.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME HYDROCHLORIC ACID

CONTINUED ON PAGE: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

HAZARD CLASS	CORROSIVE MATERIAL (LIQUID)
UN/NA	UN1789
LABELS	CORROSIVE
REPORTABLE QUANTITY	5000 LBS.

INTERNATIONAL (I.M.C.)

PROPER SHIPPING NAME	HYDROCHLORIC ACID, SOLUTION
HAZARD CLASS	8
UN/NA	UN1789
LABELS	CORROSIVE

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR ITS ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

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**LEAD REFERENCE STANDARD SOLUTION (1000
**LEAD REFERENCE STANDARD SOLUTION (1000
**LEAD REFERENCE STANDARD SOLUTION (1000

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 04/09/86
PO NBR: N/A
ACCT: 133918-01
INDEX: 02-8609-70501
CAT NO: SL21500

SUBSTANCE IDENTIFICATION

SUBSTANCE: **LEAD REFERENCE STANDARD SOLUTION (1000 PPM PB)**

TRADE NAMES/SYNONYMS: SO-L-21

MOLECULAR FORMULA: MIXTURE

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 0.14 COMPONENT: LEAD NITRATE
CAS 10099-74-8

PERCENT: 0.7 COMPONENT: NITRIC ACID
CAS 7697-37-2

PERCENT: >99 COMPONENT: WATER

EXPOSURE LIMITS:
0.05 MG(PB)/M3 OSHA TWA; 0.15 MG(PB)/M3 ACGIH TWA;
0.10 MG(PB)/M3 NIOSH RECOMMENDED TWA

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID BOILING POINT: 212 F (100 C)

MELTING POINT: 32 F (0 C) SPECIFIC GRAVITY: 1.0

EVAPORATION RATE: (ETHER=1) >1 (TTE) PH: 1.0

SOLUBILITY IN WATER: COMPLETE

C01350

Lead reference standard solution

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: WILL NOT BURN

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH USING AGENTS INDICATED; WEAR RESPIRATORY PROTECTION. IF LARGE AMOUNTS OF COMBUSTIBLE MATERIALS ARE INVOLVED, USE WATER SPRAY OR FOG IN FLOODING AMOUNTS. USE WATER SPRAY TO ABSORB CORROSIVE VAPORS. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS; KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

LEAD NITRATE: 500 MG/KG ORAL-GUINEA PIG LDLO; 432 MG/KG INTRAPERITONEAL-RAT LDLO; TERATOGENIC DATA (RTEC); MUTAGENIC DATA (RTEC); INDEFINITE ANIMAL CARCINOGEN (IARC).

INORGANIC LEAD COMPOUNDS ARE PERIPHERAL NEUROTOXINS. EXPOSURE MAY IRRITATE THE EYES, MUCOUS MEMBRANES, AND SKIN. POISONING AFFECTS THE GASTROINTESTINAL TRACT, BLOOD, AND KIDNEYS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
NEUROTOXIN.

ACUTE EXPOSURE- LEAD NITRATE MIST PARTICULATE CONCENTRATIONS CAUSES DELAYED SYMPTOMS OF FATIGUE, HEADACHE, ACHING BONES AND MUSCLES, GASTRO-INTESTINAL DISTURBANCES (PARTICULARLY CONSTIPATION), ABDOMINAL PAINS, DECREASED APPETITE, AND PULMONARY EDEMA. IF SUFFICIENT LEAD IS RETAINED AFTER A SINGLE EXPOSURE, A SYNDROME IDENTICAL WITH CHRONIC INTOXICATION MAY DEVELOP WITHIN WEEKS OR MONTHS.

CHRONIC EXPOSURE- PROLONGED OR REPEATED INHALATION OF LEAD NITRATE MAY CAUSE LEAD TO BUILD UP IN THE BODY AND A POINT MAY BE REACHED WHERE SYMPTOMS AND DISABILITY OCCUR. SYMPTOMS MAY INCLUDE FACIAL PALLOR, A "LEAD LINE" ON THE GUMS, MILD JAUNDICE, ANEMIA, DECREASED HAND-GRIP STRENGTH, LEAD CHOLIC WITH INTENSE PERIODIC ABDOMINAL CRAMPING, SEVERE CONSTIPATION, NAUSEA, VOMITING AND PERIPHERAL NEUROPATHY. THE PERIPHERAL NERVE AFFECTED MOST FREQUENTLY IS THE RADIAL NERVE, WHICH CAUSES "WRIST DROP". RECOVERY IS SLOW AND NOT ALWAYS COMPLETE. THE CENTRAL NERVOUS SYSTEM CAN BE AFFECTED, RESULTING IN SEVERE HEADACHE, CONVULSIONS, COMA, DELERIUM AND POSSIBLY

DEATH. THE KIDNEYS MAY ALSO BE DAMAGED AFTER LONG PERIODS OF EXPOSURE, WITH LOSS OF FUNCTION AND PROGRESSIVE AZOTEMIA. SEE MUTAGENIC DATA AND ANIMAL REPRODUCTIVE EFFECTS DATA REFERENCES IN TOXICITY SECTION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION.

SKIN CONTACT:
ACUTE EXPOSURE- CORROSIVE TO SKIN BECAUSE OF NITRIC ACID CONTENT (SEE PH).

CHRONIC EXPOSURE- BECAUSE OF THE NITRIC ACID CONTENT, PROLONGED OR REPEATED EXPOSURE MAY CAUSE DERMATITIS (SEE PH).

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
ACUTE EXPOSURE- BECAUSE OF NITRIC ACID CONTENT, SOLUTION IS CORROSIVE AND CAUSES BURNS (SEE PH).

CHRONIC EXPOSURE- PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 10-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
CORROSIVE/NEUROTOXIN.
ACUTE EXPOSURE- LEAD NITRATE CAUSES METALLIC TASTE, INTENSE THIRST, HEADACHE, FLUSHING OF THE SKIN, DIZZINESS, VOMITING, GASTROINTESTINAL DISTURBANCES, MARKED HYPOTENSION, CYANOSIS, CONVULSIONS, COMA, RESPIRATORY PARALYSIS AND DEATH. NITRIC ACID ADDS TO THE CORROSIVE QUALITY AS APPLIES TO GASTROINTESTINAL SYSTEM (SEE PH).

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE HIM LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ACID. DO NOT INDUCE VOMITING. GIVE PATIENT 1 OUNCE (30 ML) OF MILK OF MAGNESIA. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL PRESSURES UP TO THE BOILING POINT, 100 C.

INCOMPATIBILITIES:
EASILY OXIDIZABLE AND WATER-REACTIVE MATERIALS, EXAMPLES FOLLOW:

LEAD NITRATE:
REDUCING AGENTS: VIOLENT REACTION.
COMBUSTIBLE SUBSTANCES: VIOLENT REACTION.
ACTIVE METALS: VIOLENT REACTION.
POTASSIUM: VIOLENT REACTION.
SODIUM: VIOLENT REACTION.
POTASSIUM ACETATE: EXPLOSIVE REACTION.

AMMONIUM THIOCYANATE: EXPLOSIVE COMPOUNDS MAY BE FORMED.
LEAD HYPOPHOSPHITE: EXPLOSIVE COMPOUNDS MAY BE FORMED.

DECOMPOSITION:
NITRIC ACID BOILS AWAY MIXED WITH WATER AT 120.5 C.
LEAD NITRATE DECOMPOSES AT ABOUT 210 C FORMING TOXIC FUMES OF NITROUS OXIDES AND LEAD.

POLYMERIZATION:
WILL NOT OCCUR.

****

CONDITIONS TO AVOID

AVOID HEATING TO THE BOILING POINT, 120.5 C, WHERE EMISSION OF TOXIC ACID VAPOR OCCURS. AVOID CONTACT WITH OR STORAGE WITH INCOMPATIBLE MATERIALS, INCLUDING THOSE LISTED IN THE REACTIVITY SECTION.

****

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
WEAR PERSONAL PROTECTIVE EQUIPMENT. COVER WITH SODA ASH. SCOOP UP AND PLACE IN SUITABLE CONTAINERS, CLOSE TIGHTLY AND LABEL CORROSIVE. KEEP OUT OF SEWERS AND WATER SOURCES.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION SYSTEM TO MEET PERMISSABLE EXPOSURE LIMIT REQUIREMENTS. EQUIPMENT MUST BE RESISTANT TO CORROSION BY ACID.

RESPIRATOR:
NONE REQUIRED FOR THE PROPOSED USE OF THIS CHEMICAL.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING WHEREVER THERE IS REASONABLE PROBABILITY OF SKIN CONTACT WITH THIS SOLUTION.

GLOVES:
PROTECTIVE GLOVES ARE REQUIRED AS NECESSARY TO PREVENT ANY POSSIBILITY OF CONTACT WITH SOLUTION. PREFERRED MATERIALS: POLYETHYLENE, VITON OR SARANEX.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF SAFETY GOGGLES TO PREVENT ANY POSSIBILITY OF CONTACT WITH THIS SOLUTION. DO NOT WEAR CONTACT LENSES WHEN WORKING WITH CHEMICALS.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 11/07/85 REVISION DATE: 11/14/85

-ADDITIONAL INFORMATION-
THE INFORMATION BELOW IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, WE MAKE NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO

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Methyl Alcohol Denatured

ETHYL ALCOHOL, DENATURED
ETHYL ALCOHOL, DENATURED
ETHYL ALCOHOL, DENATURED

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 01/31/86
PO NBR: N/A
ACCT: 133918-01
INDEX: 02-8602-90422
CAT NO: A4074

SUBSTANCE IDENTIFICATION

SUBSTANCE: **ETHYL ALCOHOL, DENATURED**

TRADE NAMES/SYNONYMS: ETHANOL, DENATURED; GRAIN ALCOHOL, DENATURED; ETHYL HYDROXIDE, DENATURED; ETHYL HYDRATE, DENATURED; ALGRAIN, DENATURED; ANHYDROL, DENATURED; METHYL CARBINOL, DENATURED; COLOGNE SPIRITS, DENATURED; FERMENTATION ALCOHOL, DENATURED;

CHEMICAL FAMILY:
HYDROXYL, ALIPHATIC

CERCLA RATINGS (SCALE 0-3): HEALTH=1 FIRE=3 REACTIVITY=0 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 88.0	COMPONENT: ETHYL ALCOHOL CAS# 64-17-5
PERCENT: 4.6	COMPONENT: METHYL ALCOHOL CAS# 67-56-1
PERCENT: 0.9	COMPONENT: ETHYL ACETATE CAS# 141-78-6
PERCENT: 0.9	COMPONENT: METHYL ISOBUTYL KETONE CAS# 108-10-1
PERCENT: 0.9	COMPONENT: AVIATION GAS CAS# NOT ASSIGNED
PERCENT: 4.6	COMPONENT: WATER

EXPOSURE LIMITS:
ETHYL ALCOHOL:
1000 PPM OSHA TWA

C0125

Methyl Alcohol Denatured

TOXICITY

ETHYL ALCOHOL: 20 PPM EYE-HUMAN IRRITATION; 400 MG OPEN SKIN-RABBIT IRRITATION; 500 MG/24 HOUR SKIN-RABBIT SEVERE IRRITATION; 79 MG EYE-RABBIT IRRITATION; 100 MG/4 SECONDS EYE-RABBIT (RINSED) MODERATE IRRITATION. 2000 MG/KG ORAL-CHILD LDLO; 50 MG/KG ORAL-MAN TDLO; 1430 UG/KG ORAL-MAN TDLO; 256 GM/KG/12 WEEKS ORAL-WOMAN TDLO; 20,000 PPM/10 HOURS INHALATION-RAT LC50; 7060 MG/KG ORAL-RAT LD50; 20 GM/KG SKIN-RABBIT LDLO; 7800 MG/KG ORAL-MUSE LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORGENIC DATA (RTECS); CARCINOGEN STATUS: NONE. AN EYE AND RESPIRATORY IRRITANT AND CENTRAL NERVOUS SYSTEM DEPRESSANT.
METHY ALCOHOL: 5 PPM EYE-HUMAN IRRITATION; 500 MG/24 HOUR SKIN-RABBIT MODERATE IRRITATION; 40 MG EYE-RABBIT MODERATE IRRITATION; 340 MG/KG ORAL-HUMAN LDLO; 13 GM/KG ORAL-MAN LDLO; 86,000 MG/M3 INHALATION-HUMAN TCLO; 5628 MG/KG ORAL-RAT LD50; 64,000 PPM/4 HOURS INHALATION-RAT LC50; 20 GM/KG SKIN RABBIT LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); CARCINOGENIC STATUS: NONE.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CARCINOGEN/NARCOTIC/IRRITANT.
25,000 PPM METHYL ALCOHOL IS IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- ETHYL ALOCOHL MAY CAUSE NASAL IRRITATION, COUGH, AND AT HIGH LEVELS, A FEELING OF SUFFOCATION. CENTRAL NERVOUS SYSTEM DEPRESSION MAY OCCUR.

METHYL ALCOHOL MAY CAUSE SYMPTOMS OF INEBRIATION. WITHIN 12-18 HOURS, HEADACHE, ANOREXIA, WEAKNESS, FATIGUE, LEG CRAMPS, VERTIGO AND RESTLESSNESS OCCUR, FOLLOWED BY NAUSEA, VOMITING, DIARRHEA, DIZZINESS, NARCOSIS, AND OTHER SIGNS OF CENTRAL NERVOUS SYSTEM DEPRESSION. SEVERE ABDOMINAL, BACK, AND LEG PAINS, MUSCULAR INCOORDINATION, SWEATING, TRACHEITIS, AND BRONCHITIS MAY ENSUE. APATHY OR DELERIUM MAY PROGRESS TO COMA. EXCITEMENT, MANIA, AND CONVULSIONS OCCUR RARELY. BLURRED OR DIMMED VISION HAS OCCURED, FOLLOWED BY TRANSIENT OR PERMANENT BLINDNESS, WITH OPTIC NEURITIS, EYE PAIN AND ATROPHY, CONCENTRIC VISUAL FIELDS, AND PHOTOPHOBIA. ACIDOSIS MAY RESULT IN RAPID, SHALLOW RESPIRATION, CYANOSIS, COMA, AND HYPOTENSION. MILD TACHYCARDIA, CARDIAC DEPRESSION, AND PERIPHERAL NEURITIS ARE POSSIBLE, AS WELL AS LIVER AND KIDNEY DAMAGE AND CEREBRAL AND PULMONARY EDEMA. DEATH IS POSSIBLE FORM RESPIRATORY FAILURE OR CIRCULATORY COLLAPSE. PROLONGED ASTHENIA AND PARTIAL OR COMPLETE LOSS OF VISION IN 2-6 DAYS, AND PERMANENT RENAL DYSFUNCTION MAY FOLLOW NON-FATAL INTOXICATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO ETHYL ALCOHOL MAY CAUSE RESPIRATORY IRRITATION, HEADACHE, AND SYMPTOMS OF CENTRAL NERVOUS SYSTEM DEPRESSION, SUCH AS LACK OF CONCENTRATION AND SOMNOLENCE.

METHYL ALCOLOL MAY CAUSE VISUAL IMPAIRMENTS AS DESCRIBED IN ACUTE INHALATION.
SEE ANIMAL MUTAGENIC, REPRODUCTIVE EFFECTS AND TUMORIGENIC DATA REFERENCES IN THE TOXICITY SECTION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION.

SKIN CONTACT:
IRRITITANT/NARCOTIC.

1000 PPM ACGIH TWA
METHYL ALCOHOL:
200 PPM OSHA TWA
200 PPM ACGIH TWA (SKIN); 250 PPM ACGIH STEL (SKIN)
200 PPM NIOSH RECOMMENDED TWA; 800 PPM NIOSH RECOMMENDED 15 MINUTE CEILING

PHYSICAL DATA

DESCRIPTION: CLEAR, COLORLESS LIQUID BOILING POINT: 172 F (78 C)

MELTING POINT: -172 F (-114 C) SPECIFIC GRAVITY: 0.8

VAPOR PRESSURE: 40 MMHG @ 20 C EVAPORATION RATE: 1.4 (TTE)

SOLUBILITY IN WATER: COMPLETE SOLVENT SOLUBILITY: BENZENE, ETHER, ACETONE

ODOR THRESHOLD: 5-10 PPM VAPOR DENSITY: 1.6

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE/NEGLIGIBLE EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

FLASH POINT: 57 F (14 C) (CC) UPPER EXPLOSION LIMIT: 19%

LOWER EXPLOSION LIMIT: 4.3% AUTOIGNITION TEMP.: NON AVAILABLE

FLAMMABILITY CLASS(OSHA): IB

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR ALCOHOL FOAM (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGE FIRES, USE DRY CHEMICAL, CARBON DIOXIDE, OR ALCOHOL FOAM (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. COOL FIRE-EXPOSED CONTAINERS WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. FOR MASSIVE FIRE IN STORAGE AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES, ELSE WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF STORAGE TANK DUE TO FIRE (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED. USE FLOODING AMOUNTS OF WATER AS FOG; SOLID STREAMS MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS; KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

BY TRANSIENT OR PERMANENT BLINDNESS, WITH OPTIC NEURITIS, EYE PAIN AND ATROPHY, CONCENTRIC VISUAL FIELDS, AND PHOTOPHOBIA MAY OCCUR. CARDIAC DEPRESSION, PERIPHERAL NEURITIS, LIVER AND KIDNEY DAMAGE AND CEREBRAL AND PULMONARY EDEMA ARE POSSIBLE. DEATH IS POSSIBLE FROM RESPIRATORY FAILURE OR CIRCULATORY COLLAPSE. PROLONGED ASTHENIA AND PARTIAL OR COMPLETE LOSS OF VISION IN 2-6 DAYS, AND PERMANENT RENAL DYSFUNCTION MAY FOLLOW NONFATAL INTOXICATION.

FIRST AID- IF VICTIM IS CONSCIOUS AND NOT CONVULSING, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER. INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. THEN GIVE 1 OUNCE (30 ML) OF MILK OF MAGNESIA.

REACTIVITY

REACTIVITY:
GENERALLY STABLE UNDER NORMAL CONDITIONS. HIGHLY VOLATILE. CONTACT WITH STRONG OXIDIZERS AND INCOMPATIBLES MAY CAUSE FIRES AND EXPLOSIONS. THE SUBSTANCE REACTS WITH ALKALI METALS TO LIBERATE FLAMMABLE HYDROGEN GAS.

INCOMPATIBILITIES:
VIOLENT REACTION WITH NITRIC ACID, ACETYL CHLORIDE, AND ACETYL BROMIDE. IGNITION MAY OCCUR IN REACTIONS WITH BROMINE PENTAFLUORIDE, CHROMIC ANHYDRIDE, CHROMYL CHLORIDE, PERMANGANIC ACID, PLATINUM, POTASSIUM DIOXIDE, POTASSIUM-TERT-BUTOXIDE, AND HYDROGEN PEROXIDE/SULFURIC ACID MIXTURES. EXPLOSIONS MAY OCCUR FROM REACTIONS WITH ALUMINUM SESQUIBROMIDE ETHYLATE, BROMINE PENTAFLUORIDE, CALCIUM HYPOCHLORITE, HYDROGEN PEROXIDE-SULFURIC ACID MIXTURES, IODINE-MERCURIC OXIDE MIXTURES, MANGANESE PERCHLORATE-2,2-DIMETHOXY PROPANE MIXTURES, SOME PERCHORATES RECRYSTALLIZED FROM ETHANOL (SUCH AS SILVER PERCHLORATE AND URANYL PERCHLORATE), PERCHLORIC ACID, PERMANGANATES TREATED WITH SULFURIC ACID, PERMANGANIC ACID, POTASSIUM SUPEROXIDE, SODIUM HYDRAZIDE, AND SULFURIC ACID-SODIUM DICHROMATE MIXTURES. EXPLOSIVE COMPOUNDS MAY BE FORMED IN REACTIONS WITH AMMONIUM HYDROXIDE-SILVER(I) OXIDE MIXTURES, HYDROGEN PEROXIDE, IODINE-PHOSPHORUS, SILVER/NITRIC ACID, AND SILVER NITRATE. CHROMYL CHLORIDE CAUSES ETHANOL AND AMMONIA TO IGNITE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRES OR EXPLOSIONS. REACTIONS WITH ALKALI METALS LIBERATE FLAMMABLE HYDROGEN GAS. (ETHYL ALCOHOL)

VIOLENT REACTIONS WILL OCCUR WHEN METHYL ALCOHOL REACTS WITH CALCIUM CARBIDE, MAGNESIUM, AND CYANURIC CHLORIDE. METHANOL AND BERYLLIUM HYDRIDE REACT INTENSELY @ 200 C. REACTIONS WITH BROMINE ARE INTENSELY EXOTHERMIC. THERE IS A CHANCE FOR POSSIBLE IGNITION WHEN METHANOL REACTS WITH NICKEL IN THE PRESENCE OF NICKEL CATALYST. REACTIONS WITH CHLOROFORM/SODIUM HYDROXIDE MIXTURES IS EXPLOSIVE AND REACTIONS WITH CHROMIC ANHYDRIDE HAVE EXPLOSIVE CAPABILITIES. CONTACT WITH STRONG OXIDANTS MAY CAUSE FIRE AND EXPLOSION. (METHYL ALCOHOL)

DECOMPOSITION:
COMBUSTION MAY RELEASE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
WILL NOT OCCUR.

****

CONDITIONS TO AVOID

MAY BE IGNITED BY HEAT, SPARKS OR FLAMES. CONTAINER MAY EXPLODE IN HEAT OF

FIRE. VAPOR EXPLOSION AND POISON HAZARD INDOORS, OUTDOORS OR IN SEWERS. RUN-OFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

****

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA! KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION OR GENERAL DILUTION VENTILATION TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:
33,000 PPM (LOWER EXPLOSIVE LIMIT)- SUPPLIED-AIR RESPIRATOR WITH SEPARATE AIR SUPPLY.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
OPERATIONS WITH A RESPIRATOR ARE NOT RECOMMENDED ABOVE THE LOWER EXPLOSIVE LIMIT (3.3%).

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-PROOF SAFETY GOOGLES TO PREVENT THIS LIQUID FROM CONTACTING THE EYE. DO NOT WEAR CONTACT LENSES WHEN WORKING WITH CHEMICALS.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 11/14/85 REVISION DATE: 11/14/85

-ADDITIONAL INFORMATION-

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ACUTE EXPOSURE- ETHYL ALCOHOL CAUSES NO IMMEDIATE IRRITATING EFFECTS.
METHYL ALCOHOL MAY DEFAT THE SKIN AND CAUSE MILD DERMATATIS. IT IS READILY ABSORBED THROUGH THE SKIN AND MAY CAUSE SYMPTOMS AS WITH ACUTE INHALATION, PRINCIPALLY ACIDOSIS, CENTRAL NERVOUS SYSTEM DEPRESSION AND OPTIC NEURITIS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO ETHYL ALCOHOL MAY CAUSE DERMATITIS.
METHYL ALCOHOL MAY CAUSE ECZEMA, REDNESS, AND SCALING.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
CORROSIVE.
ACUTE EXPOSURE- ETHYL ALCOHOL VAPORS AT 5,000-10,000 PPM MAY CAUSE TEMPORARY IRRITATION. DIRECT CONTACT MAY CAUSE IMMEDIATE BURNING, LACRIMATION, LACRIMATION, TEMPORARY INJURY OF THE CORNEA AND HYPEREMIA OF THE CONJUNCTIVA.
METHYL ALCOHOL MAY CAUSE SUPERFICIAL CORNEAL LESIONS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO ETHYL ALCOHOL MAY CAUSE CONJUCTIVITIS.
BLURRED OR DIMMED VISION FOLLOWED BY TRANSIENT OR PERMANENT BLINDNESS, WITH OPTIC NEURITIS, EYE PAIN AND ATROPHY, CONCENTRIC VISUAL FIELDS, AND PHOTOPHOBIA MAY OCCUR FROM INHALATION, SKIN ABSORPTION, OR INGESTION OF METHYL ALCOHOL.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF BURNS, APPLY STERILE BANDAGES LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
NARCOTIC.
ACUTE EXPOSURE- ETHYL ALCOHOL MAY CAUSE EMOTIONAL LABILITY AND DECREASED INHIBITIONS, WITH EXHILARATION, BOASTFULNESS, TALKATIVENESS, REMORSE, AND BELLIGERENCY. MODERATE INTOXICATION LEADS TO IMPAIRED MUSCULAR COORDINATION, SLOWED REACTIONS, SLURRED SPEECH, ATAXIA, AND SLIGHT VISUAL DISTURBANCE. SEVERE POISONING RESULTS IN SENSORY DISTURBANCE OR LOSS, WITH VERTIGO AND DIPLOPIA, FLUSHING OF THE FACE, RAPID PULSE, SWEATING, NAUSEA AND VOMITING, AND INVOLUNTARY DEFICATION AND URINATION. CENTRAL NERVOUS SYSTEM DEPRESSION IS INDICATED BY DIZZINESS, DROWSINESS, STUPOR, AND OTHER SIGNS OF NARCOSIS, PROGRESSING TO COMA, WITH IMPAIRED OR ABSENT TENDON REFLEXES. CONVULSIONS MAY OCCUR FROM HYPOGLYCEMIA. THE PUPILS MAY BE NORMAL OR DILATED. SHOCK MAY FOLLOW, WITH HYPOTENSION, TACHYCARDIA, COLD PALE SKIN, AND HYPOTHERMIA. RESPIRATION MAY BE SLOW. DEATH MAY OCCUR FROM RESPIRATORY OR CIRCULATORY FAILURE OR FROM ASPIRATIONPNEUMONITIS. RECOVERY FROM POISONING MAY BE ACCOMPANIED BY HEADACHE, GASTRITIS, INFECTION, OR PSYCHOSES WITH UNCONTROLLABLE FEAR, INSOMNIA, TREMORS, AND RESTLESSNESS, FOLLOWED BY VISUAL, AUDITORY, OR GUSTATORY HALLUCINATIONS. EXAGGERATED REFLEXES, TACHYCARDIA, AND CONVULSIONS ARE POSSIBLE.
METHYL ALCOHOL MAY CAUSE SYMPTOMS AS WITH ACUTE INHALATION FROM ACIDOSIS, AND CENTRAL NERVOUS SYSTEM DEPRESSION. BLURRED OR DIMMED VISION, FOLLOWED

NITRIC ACID

000911

EM SCIENCE
A DIVISION OF EM INDUSTRIES, INC.
111 WOODCREST DRIVE, CHERRY HILL, N.J. 08034
PHONE (609) 354-9200

MATERIAL SAFETY DATA SHEET
ESSENTIALLY SIMILAR TO U.S. DEPARTMENT OF LABOR FORM OSHA-20
DATE OF PREP. 12/10/85

SECTION 1 NAME & PRODUCT

CHEMICAL NAME: NITRIC ACID

CATALOG NUMBER: NX0409

TRADE NAME: AQUAFORTIS, HYDROGEN NITRATE
CAS #: 7697-37-2 CHEMICAL FAMILY: INORGANIC ACID
FORMULA: HNO3

MOLECULAR WEIGHT 63.01

SECTION 2 PHYSICAL DATA

BOILING POINT 760 MM HG 86C	SPECIFIC GRAVITY (H2O=1) 1.5027
MELTING POINT -41.59C	SOLUBILITY IN H2O,% BY WT @20 C MISCIBLE
VAPOR PRES. @ 20C MM HG	EVAPORATION RATE (BUTYL ACETATE=1) UNKWN
VAPOR DENSITY (AIR=1) UNKWN	APPEARANCE AND ODOR CLEAR, COLORLESS LIQUID
% VOLATILES BY VOLUME UNKWN	WITH ACRID ODOR

SECTION 3 FIRE & EXPLOSION HAZARD DATA

FLASH POINT/TEST METHOD: NONFLAMMABLE FLAMMABLE LIMITS:LEL% UNKWN UEL% UNKWN

EXTINGUISHING MEDIA:
WATER SPRAY
WEAR FULL PROTECTIVE CLOTHING AND EQUIPMENT

SPECIAL HAZARDS:
WEAR SELF-CONTAINED BREATHING APPARATUS

UNUSUAL FIRE AND EXPLOSION HAZARDS:
MAY INTENSIFY A FIRE; GREATER HAZARD AT ELEVATED TEMPERATURE

SECTION 4 REACTIVITY DATA

STABLE X CONDITIONS TO AVOID:
REACTS READILY WITH MOST CHEMICALS

MATERIALS TO AVOID:
( ) WATER ( ) ACIDS (X) BASES ( ) CORROSIVES ( ) OXIDIZERS
( ) OTHER:REACTS EXPLOSIVELY WITH METALLIC POWDERS, CARBIDES,

CONTINUED ON PAGE 2

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NITRIC ACID
MATERIAL SAFETY DATA SHEET

SECTION 4 REACTIVITY DATA

HYDROGEN, TURPENTINE

HAZARDOUS DECOMPOSITION PRODUCTS:
TOXIC FUMES INCLUDING NOX

SECTION 5 SPILL OR LEAK PROCEDURES AND DISPOSAL

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
DILUTE WITH LARGE AMOUNTS OF WATER
NEUTRALIZE WITH SODA ASH

WASTE DISPOSAL METHOD: TO BE PERFORMED IN COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION 6 HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE:
2 PPM

TXDS:
ORL-HMN LDLO: 430 MG/KG

THRESHOLD VALUE:
UNKNOWN
EFFECTS OF OVEREXPOSURE:
POSSIBLY FATAL BY INHALATION OR INGESTION.
CONTACT WITH LIQUID OR CONCENTRATED VAPOR CAUSES SEVERE BURNS.
INHALATION OF VAPORS OR GASEOUS OXIDES INJURES LUNGS (SYMPTOMS MAY BE DELAYED 4 - 30 HOURS); PULMONARY EDEMA MAY RESULT.
VAPORS MAY IMMEDIATELY AND PERMANENTLY DAMAGE VISION.
FIRST AID PROCEDURES:
SKIN: FLUSH THOROUGHLY WITH WATER; WASH WITH SOAP/WATER; GET MEDICAL ASSISTANCE
EYES: FLUSH WITH WATER 15 MINUTES HOLDING LIDS APART; GET MEDICAL ASSISTANCE
INHALATION: REMOVE TO FRESH AIR; GET MEDICAL ASSISTANCE
INGESTION: DRINK PLENTY OF WATER IF CONSCIOUS; GET MEDICAL ASSISTANCE.
GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE

SECTION 7 SPECIAL PROTECTION INFORMATION

VENTILATION, RESPIRATORY PROTECTION, PROTECTIVE CLOTHING, EYE PROTECTION:

CONTINUED ON PAGE 3

NITRIC ACID
MATERIAL SAFETY DATA SHEET

SECTION 7 SPECIAL PROTECTION INFORMATION

VENTILATION, RESPIRATORY PROTECTION, PROTECTIVE CLOTHING, EYE PROTECTION:
PROVIDE ADEQUATE GENERAL MECHANICAL AND LOCAL EXHAUST VENTILATION.
PROTECT EYES AND SKIN WITH SAFETY GOGGLES AND GLOVES
WEAR FULL FACE SHIELD, IMPERVIOUS CLOTHING AND BOOTS
DO NOT BREATHE VAPORS
DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING

SECTION 8 SPECIAL HANDLING AND STORING PRECAUTIONS

SPECIAL HANDLING AND STORING PRECAUTIONS:
KEEP CONTAINER TIGHTLY CLOSED AND PROTECTED AGAINST PHYSICAL DAMAGE
STORE IN A COOL, DRY, WELL-VENTILATED AREA; PROTECT AGAINST DIRECT SUNLIGHT
STORE SEPARATE FROM INCOMPATIBLE MATERIALS, ORGANIC ACIDS AND ALL COMBUSTIBLE, ORGANIC OR OTHER READILY OXIDIZABLE MATERIALS
KEEP UPRIGHT
WASH THOROUGHLY AFTER HANDLING

SECTION 9 HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENTS:
UNKNOWN

SECTION 10 OTHER INFORMATION

NFPA 704 : 3 0 0
HEALTH FLAMMABILITY REACTIVITY

COMMENTS:

Nitric Acid

J. T. BAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: NITRIC ACID
FORMULA: HNO3
FORMULA WT: 63.01
CAS NO.: 07697-37-2
NIOSH/RTECS NO.: QU5775000
COMMON SYNONYMS: HYDROGEN NITRATE
PRODUCT CODES: 4801,9602,9598,9606,5371,9597,9600,5113,9616,9605,9601

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	(POISON)
FLAMMABILITY	-	0	
REACTIVITY	-	3	(OXIDIZER)
CONTACT	-	4	(CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
STRONG OXIDIZER - CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE
LIQUID AND VAPOR CAUSE SEVERE BURNS - MAY BE FATAL IF SWALLOWED
HARMFUL IF INHALED AND MAY CAUSE DELAYED LUNG INJURY
SPILLAGE MAY CAUSE FIRE OR LIBERATE DANGEROUS GAS
KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS. DO NOT STORE NEAR COMBUSTIBLE MATERIALS. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, FLOOD WITH WATER. FLUSH SPILL AREA WITH WATER SPRAY.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
NITRIC ACID	65-75	7697-37-2

SECTION III - PHYSICAL DATA

BOILING POINT: 120 C (248 F)
VAPOR PRESSURE(MM HG): 2.9
MELTING POINT: -42 C (-44 F)
VAPOR DENSITY(AIR=1): 2.5
SPECIFIC GRAVITY: 1.50 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

CONTINUED ON PAGE: 2

SECTION III - PHYSICAL DATA (CONTINUED)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: COLORLESS LIQUID, WITH CHOKING ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A NFPA 704M RATING: 3-0-0 OXY

FIRE EXTINGUISHING MEDIA
USE WATER SPRAY.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.

TOXIC GASES PRODUCED
NITROGEN OXIDES

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3 (2 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 10 MG/M3 (4 PPM)

EFFECTS OF OVEREXPOSURE
LIQUID MAY CAUSE SEVERE BURNS TO SKIN AND EYES.
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM
INHALATION OF VAPORS MAY CAUSE COUGHING, CHEST PAINS, DIFFICULTY BREATHING OR UNCONSCIOUSNESS.
INGESTION MAY BE FATAL.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FO AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

CONTINUED ON PAGE: 3

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, LIGHT

INCOMPATIBLES: STRONG BASES, COMBUSTIBLE MATERIALS, STRONG REDUCING AGENTS

DECOMPOSITION PRODUCTS: OXIDES OF NITROGEN

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STO LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WIT SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER. KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL.

J. T. BAKER NEUTRASORB(R) OR NEUTRASOL(R) "LOW NA+" ACID NEUTRALIZERS ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 100 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, ACID-RESISTANT GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: YELLOW

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE

CONTINUED ON PAGE: 4

SECTION IX - STORAGE AND HANDLING PRECAUTIONS (CONTINUED)

AND COMBUSTIBLE MATERIALS.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	NITRIC ACID (OVER 40%)
HAZARD CLASS	OXIDIZER
UN/NA	UN2031
LABELS	OXIDIZER, CORROSIVE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	NITRIC ACID
HAZARD CLASS	8
UN/NA	UN2031
LABELS	CORROSIVE

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

-- LAST PAGE --

AmeriGas
INDUSTRIAL GASES DIVISION
P.O. BOX 965
VALLEY FORGE, PA 19482

EMERGENCY PHONE NUMBERS:
(215) 337-8900—Valley Forge, PA
(415) 229-3050—Martinez, CA
(713) 944-1924—So. Houston, TX
(414) 258-8970—West Allis, WI

OXYGEN

MATERIAL SAFETY DATA SHEET

PRODUCT NAME	CAS #
Oxygen	7782-44-7
TRADE NAME AND SYNONYMS: Oxygen	DOT I.D. No.: UN 1072
CHEMICAL NAME AND SYNONYMS: Oxygen	DOT Hazard Class: Nonflammable gas
ISSUE DATE AND REVISIONS: 25 November 1985	Formula: O_2
	Chemical Family: Oxidizer

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT
None established (ACGIH, 1985-86). Oxygen is the "vital element" in the atmosphere in which we live and breathe (approximately 21 molar % of the atmosphere).

SYMPTOMS OF EXPOSURE
Breathing high concentrations (greater than 75 molar percent) causes symptoms of hyperoxia which include cramps, nausea, dizziness, hypothermia, ambylopia, respiratory difficulties, bradycardia, fainting spells, and convulsions capable of leading to death. For additional information on hyperoxia, see Compressed Gas Association's Pamphlet P-14.

TOXICOLOGICAL PROPERTIES

The property is that of hyperoxia which leads to pneumonia. Concentrations between 25 and 75 molar percent present a risk of inflammation of organic matter in the body.

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO OXYGEN. RESCUE PERSONNEL SHOULD BE COGNIZANT OF EXTREME FIRE HAZARD ASSOCIATED WITH OXYGEN-RICH ATMOSPHERES.

Conscious persons should be assisted to an uncontaminated area and breathe fresh air. They should be kept warm and quiet. The physician should be informed that the victim is experiencing (has experienced) hyperoxia.

Unconscious persons should be moved to an uncontaminated area and given assisted respiration. When breathing has been restored, treatment should be as above. Continued treatment should be symptomatic and supportive.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Oxygen vigorously accelerates combustion. Contact with all flammable materials should be avoided. Some materials which are not flammable in air will burn in pure oxygen or oxygen-enriched atmospheres.

PHYSICAL DATA

BOILING POINT -297.3°F (-182.9°C)	LIQUID DENSITY AT BOILING POINT 71.23 lb/ft^3 (1141 kg/m^3)
VAPOR PRESSURE @ 70°F (21.1°C) Above the critical temp. of -181.1°F (-118.4°C)	GAS DENSITY AT 70°F, 1 atm .0828 lb/ft^3 (1.326 kg/m^3)
SOLUBILITY IN WATER Slightly	FREEZING POINT -361.8°F (-218.8°C)
EVAPORATION RATE N/A	SPECIFIC GRAVITY (AIR=1) @ 70°F (21.1°C) = 1.11
APPEARANCE AND ODOR Colorless, odorless gas	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMAGLE LIMITS % BY VOLUME LEL N/A	UEL N/A
EXTINGUISHING MEDIA Copious quantities of water for fires with oxygen as the oxidizer.		ELECTRICAL CLASSIFICATION Nonhazardous	

SPECIAL FIRE FIGHTING PROCEDURES

If possible, stop the flow of oxygen which is supporting the fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vigorously accelerates combustion.

REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID
Unstable		N/A
Stable	X	

INCOMPATIBILITY (Materials to avoid)

All flammable materials

HAZARDOUS DECOMPOSITION PRODUCTS

None

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID
May Occur		N/A
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

WASTE DISPOSAL METHOD Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)		
N/A		
VENTILATION	LOCAL EXHAUST	SPECIAL
To prevent accumulation above 25 molar percent.	To prevent accumulation above 25 molar percent.	N/A
	MECHANICAL (Gen.)	OTHER
	N/A	N/A
PROTECTIVE GLOVES		
As required; any material		
EYE PROTECTION		
Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT		
Safety shoes, safety shower		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION

DOT Shipping Name: Oxygen or Oxygen, compressed DOT Hazard Class: Nonflammable gas
DOT Shipping Label: Oxidizer I.D. No.: UN 1072

SPECIAL HANDLING RECOMMENDATIONS

Use only in well-ventilated areas. Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

For additional handling recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and G-4.

SPECIAL STORAGE RECOMMENDATIONS

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits and away from full or empty stored cylinders which contain flammable products. Do not allow the temperature where cylinders are stored to exceed 130F (54C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and G-4.

SPECIAL PACKAGING RECOMMENDATIONS

Carbon steels and low alloy steels are acceptable for use at lower pressures. For high pressure applications use stainless steels, copper and its alloys, nickel and its alloys, brass, bronze, silicon alloys, Monel®, Inconel® or beryllium. Lead and silver or lead and tin alloys are good gasketing materials. Teflon® and Kel-F® are the preferred nonmetal gaskets.

Special Note: It should be recognized that the ignition temperature of metals and nonmetals in pure oxygen service decreases with increasing oxygen pressure.

OTHER RECOMMENDATIONS OR PRECAUTIONS

Oxygen should not be used as a substitute for compressed air in pneumatic equipment since this type generally contains flammable lubricants. Equipment to contain oxygen must be "cleaned for oxygen service." See Compressed Gas Association Pamphlet G-4.1. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance

AmeriGas
INDUSTRIAL GASES DIVISION
P.O. BOX 965
VALLEY FORGE, PA 19482

EMERGENCY PHONE NUMBERS:
(215) 337-8900—Valley Forge, PA
(415) 229-3050—Martinez, CA
(713) 944-1924—So. Houston, TX
(414) 258-8970—West Allis, WI

1-8% OXYGEN IN ARGON
MATERIAL SAFETY DATA SHEET

PRODUCT NAME 1-8% Oxygen in Argon	CAS # For oxygen = 7782-44-7; For Argon = 7440-37-1
TRADE NAME AND SYNONYMS 1-8% Oxygen in Argon	DOT I.D. No.: UN 1956
CHEMICAL NAME AND SYNONYMS 1-8% Oxygen in Argon	DOT Hazard Class: Nonflammable gas
ISSUE DATE AND REVISIONS 25 November 1985	Formula: 1-8 Molar % O_2 in Ar
	Chemical Family: Gas mixture

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT No TWA is established. The gas mixtures are simple asphyxiants. Oxygen levels should be maintained at greater than 18 molar percent at (Continued on last page.)

SYMPTOMS OF EXPOSURE

Effects of exposure to high concentrations so as to displace the oxygen in the air necessary for life are headache, dizziness, labored breathing and eventual unconsciousness.

TOXICOLOGICAL PROPERTIES

Mixtures are nontoxic but the liberation of a large amount in a confined area could displace the amount of oxygen in air necessary to support life.

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO THESE MIXTURES. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

C01355

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

None

PHYSICAL DATA (See Note on Last Page.)

BOILING POINT Gas mixture	LIQUID DENSITY AT BOILING POINT Gas mixture
VAPOR PRESSURE Gas mixture	GAS DENSITY AT 70°F, 1 atm Gas mixture
SOLUBILITY IN WATER Gas mixture	FREEZING POINT Gas mixture
EVAPORATION RATE Gas mixture	SPECIFIC GRAVITY (AIR=1) @ 70°F (21.1°C) = Greater than 1.0
APPEARANCE AND ODOR Colorless, odorless gas.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	AUTO IGNITION TEMPERATURE N/A	FLAMMAGLE LIMITS % BY VOLUME LEL N/A	UEL N/A
EXTINGUISHING MEDIA Nonflammable gas mixture		ELECTRICAL CLASSIFICATION Nonhazardous	
SPECIAL FIRE FIGHTING PROCEDURES N/A			
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A			

REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID N/A
Stable	X	
INCOMPATIBILITY (Materials to avoid) None		
HAZARDOUS DECOMPOSITION PRODUCTS None		
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID N/A
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

WASTE DISPOSAL METHOD Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION See Local Exhaust on last page.	LOCAL EXHAUST See last page.	SPECIAL N/A
	MECHANICAL (Gen.) N/A	OTHER N/A
PROTECTIVE GLOVES As required when welding		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes and appropriate head and eye protection when welding		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION

DOT Shipping Name: Compressed gas, n.o.s. DOT Hazard Class: Nonflammable gas
DOT Shipping Label: Nonflammable gas I.D. No.: UN 1956

SPECIAL HANDLING RECOMMENDATIONS

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

For additional handling recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14 and Safety Bulletin SB-2.

SPECIAL STORAGE RECOMMENDATIONS

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130F (54C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14 and Safety Bulletin SB-2.

SPECIAL PACKAGING RECOMMENDATIONS

These gas mixtures are noncorrosive and may be used with any common structural material.

OTHER RECOMMENDATIONS OR PRECAUTIONS

Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

TIME WEIGHTED AVERAGE EXPOSURE LIMIT: (Continued)

normal atmospheric pressure which is equivalent to a partial pressure of 135 mm Hg (ACGIH, 1985-86).

PHYSICAL DATA: (Continued)

For physical data of the pure gases, see your supplier's material safety data sheets for oxygen and argon.

LOCAL EXHAUST: (Continued)

To prevent accumulation of high concentrations so as to reduce the oxygen level in the air to less than 18 molar percent.

PHFFT Aerosol Duster

CERRO COPPER PRODUCTS CO.
A member of The Marmon Group of companies
P.O. Box 681
East St. Louis, Illinois 62202
618/337-6000

August 22, 1986

Fischer Scientific
1241 Ambassador Building
St. Louis, Missouri 63178

RE: PHFFT Aerosol Duster

Gentlemen:

In order for us to determine if the material captioned above, which we purchase from you, contains any ingredients which will require us to "list" it under the requirements of the OSHA Hazard Communication Standard, would you please supply us with your most recent Material Safety Data Sheet.

> The data sheet must contain the ingredients which make up the material.

If you consider the formula a trade secret, please supply a separate list of just the ingredients (not their percentages) which make up more than 0.1% of the material.

If you do not desire to supply a list of ingredients, then:

1. Provide a statement on the MSDS that says no ingredients in the material would require it to be listed under the OSHA Hazard Communication Standard.

2. Or, list only those ingredients on the MSDS which would require it to be placed on a Hazard Communication list.

Thank you in advance for your cooperation in supplying this important information.

Yours very truly,

C01356

CERRO COPPER PRODUCTS CO.
A member of The Marmon Group of companies

F. Baker Ottofy III

F. Baker Ottofy III
Director of Safety

See attached

FBO/jpl An MSDS for this item is not required. Jim Phillips Fisher Sc

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FFFFFFFFFF   III    SSSSSS   HH   HH   EEEEEEE   RRRRR
FFFFFFFFFF   III  SS     SS  HH   HH   EEEEEEE   RR  RR
FFF          III   SS        HH   HH   EE        RR   RR
FFFFFFFF     III     SS      HHHHHHH   EEEEEEE   RRRRR
FFFFFFFF     III       SS    HHHHHHH   EEEEEEE   RRRR
FFF          III         SS  HH   HH   EE        RR RR
FFF          III  SS    SS   HH   HH   EEEEEEE   RR  RR
FFF          III    SSSSS    HH   HH   EEEEEEE   RR   RR

        MM   MM    SSSSS   DDDDDD      SSSSS
        MMM MMM   SS       DD   DD    SS
        MM M MM    SSS     DD   DD      SSS
        MM   MM      SS    DD   DD         SS
        MM   MM   SSSSS    DDDDDD      SSSSS
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09/09/86 133918-01

CAT NBR	DESCRIPTION
1523220	PHFFT AEROSOL DUSTER 18 OZ

IMPORTANT SAFETY INFORMATION -- DO NOT DISCARD.

PLEASE ROUTE TO COMPANY SAFETY OFFICER.

FISHER SCIENTIFIC HAS A COMPLETE LINE OF SAFETY PRODUCTS AND INFORMATION FOR THE LABORATORY. CONTACT YOUR LOCAL FISHER BRANCH FOR FILMS, BROCHURES, CATALOGS AND PRODUCTS.

CERRO COPPER & BRASS CO
HGWY 3 ALTON & SRN TRACKS
SAUGET ILL 62004
P P E ST LOUIS ILL 62202

FOR EACH CHEMICAL, ONLY 1 MSDS WILL BE SENT UNLESS A MAJOR REVISION HAS BEEN MADE.

IF NAME AND/OR ADDRESS HAVE CHANGED, CONTACT YOUR FISHER SALES REPRESENTATIVE OR YOUR LOCAL FISHER BRANCH.

REQUIRED MATERIAL SAFETY DATA SHEETS (MSDS) NOT INCLUDED IN THIS MAILING WILL FOLLOW UNDER SEPARATE COVER.
THIS PACKET MAY CONTAIN MSDS FOR PRODUCTS MANUFACTURED BY OTHERS AND DISTRIBUTED BY FISHER SCIENTIFIC COMPANY. THESE MSDS WERE PREPARED BY THE MANUFACTURER AND FISHER DISCLAIMS ALL LIABILITY FOR THE CONTENT.

PHFFT Dus

PHFFT Duster
15-232-20

CHEMTRONICS INC. 681 Old Willets Path, Hauppauge, N.Y. 11788 (516) 582-3322

U.S. Department of Labor
Occupational Safety & Health Administration (OSHA)
MATERIAL SAFETY DATA SHEET

PRODUCT TYPE: Contact Cleaners | Specialty Cleaners Phift Duster

	Kontact Clean	Kontact Restorer	Head/Disc Cleaner	70 PSI (15-232-20)
Trade Name & Synonyms:				
Chemical Family:	Halogenated hydrocarbon solvents, propellant	Halogenated hydrocarbon solvent, lubricant, propellant	Halogenated hydrocarbon solvent, aliphatic alcohol, propellant	Propellant
Section II INGREDIENTS				
Solvents	Trichlorofluoromethane Trichlorotrifluoroethane (97%) TLV 1000 PPM Carbon Dioxide (3%) TLV 5000 PPM	Trichlorotrifluroethane (93%) TLV 1000 PPM Hydrotreated light paraffinic distillate (4%) TLV 5mg/m³ Carbon Dioxide (3%) TLV 5000 PPM	Trichlorotrifluoroethane (94%) TLV 1000 PPM Isopropyl Alcohol (3%) TLV 400 PPM Carbon Dioxide (3%) TLV 5000 PPM	Dichlorodifluoromethane (100%) TLV 1000 PPM
Section III PHYSICAL DATA OF CONCENTRATE SYSTEM				
Boiling Point Range (°F)	75 → 118	75 → greater than 600	116 → 180	−22 → −20
Water Solubility	0.08%	0.01%	0.1%	0.01%
Specific Gravity (H_2O = 1)	1.46 @ 77°F	1.43 @ 77°F	1.54 @ 77°F	1.31 @ 77°F
Percent Volatile	100	96	100	100
Appearance	Colorless liquid	Colorless liquid	Colorless liquid	Colorless liquid
Odor	Slight ethereal odor	Slight ethereal odor	Slight ethereal odor	Slight ethereal odor
Section IV FIRE & EXPLOSION HAZARD DATA				
Flash Point	None	365°F for non-volatile portion	None	None
Extinguishing Media	Non-flammable	dry chemical foam, carbon dioxide	Non-flammable	Non-flammable
Unusual Fire & Explosive Hazards	Self contained breathing apparatus and protective clothing should be worn in fighting fires when chemicals are present. At flame temperatures (above 400°F) decomposition products are extremely toxic. Aerosol can will not withstand temperatures above 120°F – explosion and resulting damage will occur.		Addition of excess water (over 0.2%) will extract alcohol and may form a flammable supernatant liquid layer	
Section V HEALTH HAZARD DATA				
Threshold Limit Value (TLV)	1000 PPM	1000 PPM	900 PPM	1000 PPM
Effects of Over Exposure	Light headedness, giddiness, shortness of breath, possible narcosis, possible cardiac arrythmias at high concentrations.			
First Aid Procedures	Inhalation: Remove to fresh air. Do not give epinephrine or similar drugs. If necessary, call a physician. Skin or eye contact: Flush with water that is not hot or too cold. If necessary, call a physician.			
Section VI REACTIVITY DATA				
Incompatibility	Avoid open flames and high temperatures: 120°F for aerosols, 400°F for solvent spray and liquid. Avoid contact with alkali and alkaline earth metals including powdered aluminum, beryllium and zinc.			
Hazardous Decomposition Products	Hydrochloric and hydrofluoric acids, also possible carbonyl halides.			
Section VII SPILL OR LEAK PROCEDURES				
Steps to be taken	Ventilate area especially low places where heavy vapor might collect. Remove open flames and hot (120°F) objects.			
Waste Disposal Method	Exhaust aerosol can contents to atmosphere at a rate that the TLV is not exceeded. Chemtronics recommends that all local, state and federal regulations concerning health and pollution be reviewed to determine approved disposal procedures.			
Section VIII SPECIAL PROTECTION INFORMATION				
Respiratory Protection	Avoid breathing mist during spray applications. Use approved respiratory protection such as an air supplied mask or MSHA/NIOSH approved organic type respirator in absence or proper environmental control, or when used in an enclosed space, or when high concentrations are present.			
Section IX SPECIAL PRECAUTION				
Handling and Storing	Safety glasses or goggles are required. A safety shower and eye wash station should be present for all industrial chemical applications.			
Other Precautions	Do not store where temperatures might exceed 120°F. Use with adequate ventilation (equivalent to outdoors). Do not use where open flames, heating elements, or other hot objects (above 400°F) are present. Do not ingest. Do not eat, drink or smoke where vapors are present. Keep out of the reach of children.			

POTASSIUM HYDROXIDE, SOLID
POTASSIUM HYDROXIDE, SOLID
POTASSIUM HYDROXIDE, SOLID

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 04/09/86
PO NBR: N/A
ACCT: 133918-01
INDEX: 02-8609-70501
CAT NO: P2503

SUBSTANCE IDENTIFICATION

CAS-NUMBER 1310-58-3

SUBSTANCE: **POTASSIUM HYDROXIDE, SOLID**

TRADE NAMES/SYNONYMS: CAUSTIC POTASH; POTASSA; POTASSIUM HYDRATE; CAUSTIC LYE; LYE; POTASSIUM HYDROXIDE DIMER; UN 1813; P-250; P-251; P-246

CHEMICAL FAMILY:
INORGANIC BASE

MOLECULAR FORMULA: K-O-H MOL WT: 56.11

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=1 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: >85 COMPONENT: POTASSIUM HYDROXIDE

PERCENT: <15 COMPONENT: WATER

PERCENT: <1 COMPONENT: POTASSIUM CARBONATE

EXPOSURE LIMITS:
2 MG/M3 ACGIH CEILING

PHYSICAL DATA

DESCRIPTION: HYGROSCOPIC, ODORLESS, WHITE PELLETS OR FLAKES.

BOILING POINT: 2408 F (1320 C) MELTING POINT: 681 F (360 C)

SPECIFIC GRAVITY: 2.0 VAPOR PRESSURE: 1 MMHG @ 715 C

PH: 0.1 M SOLUTION 13.5 SOLUBILITY IN WATER: 107%

C01357

Potassium Hydroxide
Solid

SOLVENT SOLUBILITY: ALCOHOL, GLYCERINE

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

EXOTHERMIC REACTION WITH WATER MAY RELEASE ENOUGH HEAT TO IGNITE COMBUSTIBLE MATERIALS.

FLASH POINT: NON-COMBUSTIBLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH USING AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. USE FLOODING AMOUNTS OF WATER AS FOG, APPLY FROM AS FAR A DISTANCE AS POSSIBLE (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

5 MG/24 HOURS SKIN-RABBIT MODERATE IRRITATION; 1 MG/24 HOURS EYE-RABBIT MODERATE IRRITATION; CARCINOGEN STATUS: NONE.
POTASSIUM HYDROXIDE IS A SEVERE EYE, MUCOUS MEMBRANE, AND SKIN IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
IRRITANT.
ACUTE EXPOSURE- MAY CAUSE IRRITATION, SORE THROAT, COUGHING, DYSPNEA, PULMONARY EDEMA.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE BRONCHIAL IRRITATION, COUGHING, BRONCHIAL PNEUMONIA, AND GASTROINTESTINAL DISTURBANCES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION.

SKIN CONTACT:
IRRITANT.
ACUTE EXPOSURE- MAY CAUSE IRRITATION, AND SOFT NECROTIC DEEPLY PENETRATING BURNS OR CONTACT. PENETRATION MAY CONTINUE FOR SEVERAL DAYS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING WHILE RUNNING STREAMS OF WATER UNDER CLOTHING. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION.

EYE CONTACT:
IRRITANT.

ACUTE EXPOSURE- CONTACT WITH VAPORS AND/OR FUMES MAY CAUSE IRRITATION, REDNESS, PAIN, BLURRED VISION, CONJUCTIVITIS AND BURNS. DIRECT CONTACT MAY CAUSE CONJUNCTIVAL EDEMA AND DAMAGE AND CORNEAL AND EPISCLERAL DAMAGE OR DESTRUCTION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO VAPORS AND/OR FUMES MAY CAUSE CONJUCTIVITIS AND CORNEAL BURNS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). IN PRESENCE OF BURNS, APPLY STERILE BANDAGES LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION.

INGESTION:
IRRITANT.

ACUTE EXPOSURE- SEVERE PAIN IN THE MOUTH, THROAT, AND ABDOMEN, VOMITING, HEMATEMESIS, DIARRHEA, ANOREXIA, DIZZINESS, COLLAPSE, COMA, AND DEATH ARE POSSIBLE. IF DEATH DOES NOT OCCUR IN THE FIRST 24 HOURS, GASTRIC OR ESOPHAGEAL PERFORATION MAY CAUSE SEVERE ABDOMINAL PAIN, RIGIDITY, AND SUDDEN HYPOTENSION AFTER 2-4 DAYS. ESOPHAGEAL STRICTURE MAY OCCUR LATER, EVEN AFTER SEVERAL YEARS.

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE HIM LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ALKALI. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
EXOTHERMIC REACTION WITH WATER. IT GENERATES CONSIDERABLE HEAT AND FORMS CORROSIVE FUMES.

INCOMPATIBILITIES:
POTASSIUM HYDROXIDE
NITRIC TRICHLORIDE: EXPLOSIVE REACTION.
PHOSPHORUS: EXPLOSIVE REACTION.
CHLORINE: EXPLOSIVE REACTION.
N-METHYL-N-NITROSOUREA AND METHYLENE CHLORIDE: EXPLOSIVE REACTION.
N-NITROSOMETHYLENE: EXPLOSIVE REACTION.
NITROBENZENE: EXPLOSIVE REACTION ON HEATING.
MALEIC ANHYDRIDE: EXPLOSIVE REACTION.
TETRAHYDROFURAN: POSSIBLE EXPLOSIVE REACTION.
CHLORINE DIOXIDE: POSSIBLE EXPLOSIVE REACTION.
ACROLEIN: VIOLENT POLYMERIZATION.
ACRYLONITRILE: VIOLENT POLYMERIZATION.
CHLOROFORM AND METHANOL: INTENSE EXOTHERMIC REACTION.

BENZOYL CHLORIDE AND SODIUM AZIDE: VIOLENT EXOTHERMIC REACTION.
O-NITROPHENOL (MOLTEN): VIOLENT REACTION.
POTASSIUM PEROXODISULFATE: IGNITION REACTION.
POTASSIUM PERSULFATE AND WATER: IGNITION REACTION.
2,2,3,3-TETRAFLUOROPROPANOL: IGNITION REACTION.
HYPONITROUS ACID: IGNITION REACTION.
TETRACHLOROETHANE: IGNITION ON HEATING.
THORIUM CARBIDE: INCANDESCENT REACTION ON HEATING.
AMMONIUM HEXACHLOROPLATINATE: FORMATION OF EXPLOSIVE PRODUCT.
1,2-DICHLOROETHYLENE: FORMATION OF EXPLOSIVE PRODUCT.
NITROPARAFFINS (NITROETHANE; NITROMETHANE): FORMATION OF EXPLOSIVE PRODUCT.
NITROALKANES: FORMATION OF EXPLOSIVE PRODUCT.
CALCIUM CARBIDE AND CHLORINE: FORMATION OF EXPLOSIVE PRODUCT.
2,4,6-TRINITROTOLUENE AND METHANOL: FORMATION OF EXPLOSIVE PRODUCT.
TRICHLOROETHYLENE: FORMATION OF EXPLOSIVE PRODUCT ON HEATING.
TETRACHLOROETHANE: FORMATION OF FLAMMABLE PRODUCT.
ACIDS: REACTS VIOLENTLY.
METALS: CORROSIVE REACTION WITH FORMATION OF FLAMMABLE HYDROGEN GAS.
GERMANIUM: INCANDESCENT REACTION.

DECOMPOSITION:
THERMAL OR CHEMICAL DECOMPOSITION MAY RELEASE TOXIC FUMES OF POTASSIUM OXIDE WHICH CAN REACT WITH WATER OR STEAM TO PRODUCE HEAT.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. MAY IGNITE COMBUSTIBLES (WOOD, PAPER, OIL, ETC.).

****

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG A HOLDING AREA SUCH AS A PIT, POND OR LAGOON TO CONTAIN SPILL AND DIKE SURFACE FLOW USING BARRIER OF SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED CONCRETE. ABSORB LIQUID MASS WITH FLY ASH OR CEMENT POWDER.

ADD DILUTE ACID TO NEUTRALIZE.

AIR SPILL:
APPLY WATER SPRAY TO KNOCK DOWN AND REDUCE VAPORS. KNOCK-DOWN WATER IS CORROSIVE AND TOXIC AND SHOULD BE DIKED FOR CONTAINMENT.

WATER SPILL:
NEUTRALIZE WITH DILUTE ACID OR REMOVEABLE STRONG ACID.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO GLASS OR PLASTIC CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY GLASS OR PLASTIC CONTAINER AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA

AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:

2000 MG/M3- SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE, HELMET, OR HOOD. SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

FIRE FIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE, OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 02/27/85 REVISION DATE: 04/26/85

-ADDITIONAL INFORMATION-

POTASSIUM NITRATE
POTASSIUM NITRATE
POTASSIUM NITRATE

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 04/09/86
PO NBR: N/A
ACCT: 133918-01
INDEX: 02-8609-70501
CAT NO: P2633

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7757-79-1

SUBSTANCE: **POTASSIUM NITRATE**

TRADE NAMES/SYNONYMS: NITER; NITRE; SALTPETER; P-383; P-261; P-263

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: K-N-03 MOL WT 101.11

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: POTASSIUM NITRATE

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
NONE ESTABLISHED

PHYSICAL DATA

DESCRIPTION: COLORLESS, TRANSPARENT PRISMS, WHITE GRANULAR OR CRYSTALLINE POWDER, WITH A COOLING, SALINE, PUNGENT TASTE

BOILING POINT: 752 F (400 C) DEC MELTING POINT: 633 F (334 C)

SPECIFIC GRAVITY: 2.1 PH: 7.0 SOLUBILITY IN WATER: 13.3%

SOLVENT SOLUBILITY: LIQUID AMMONIA, GLYCEROL

C01259

Potassium nitrate

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
OXIDIZING AGENT: MAY CAUSE IGNITION, VIOLENT COMBUSTION OR EXPLOSION WHEN IN CONTACT WITH EASILY OXIDIZABLE SUBSTANCES; INCREASES THE FLAMMABILITY OF COMBUSTIBLE MATERIALS.

FLASH POINT: NON-FLAMMABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE OR WATER SPRAY
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGE FIRES, USE WATER SPRAY OR FOG
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. FOR MASSIVE FIRE IN STORAGE AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; ELSE WITHDRAW FROM AREA AND LET FIRE BURN (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FLOOD WITH WATER. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS OR DUSTS. EVACUATE TO A RADIUS OF 2500 FEET FOR UNCONTROLLABLE FIRES (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

3015 MG/KG ORAL-RABBIT LD50; 100 MG/KG INTRAVENOUS-CAT LDLO; MUTAGENIC DATA (RTEC); TERATOGENIC DATA (RTEC); CARCINOGENIC STATUS: NONE.
POTASSIUM NITRATE IS AN EYE, MUCOUS MEMBRANE, AND SKIN IRRITANT. POISONING AFFECTS THE BLOOD.

HEALTH EFFECTS AND FIRST AID

INHALATION:
IRRITANT.
ACUTE EXPOSURE- COUGHING, DYSPNEA, DIZZINESS, HEADACHE, FLUSHING OF THE SKIN, NAUSEA, VOMITING, SHOCK, MARKED HYPOTENSION, CYANOSIS, CONVULSIONS, COMA, AND RESPIRATORY PARALYSIS MAY OCCUR.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE SYMPTOMS AS WITH ACUTE INHALATION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION. TREAT METHEMOGLOBINEMIA. (DREISBACH, HANDBOOK OF POISONING, 11TH ED.) OXYGEN AND METHEMOGLOBINEMIA TREATMENT MUST BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL.

SKIN CONTACT:
IRRITANT.

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE IRRITATION. ABSORPTION MAY CAUSE SYMPTOMS AS WITH ACUTE INHALATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE DERMATITIS. ABSORBTION MAY CAUSE SYMPTOMS AS WITH ACUTE INHALATION.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

EYE CONTACT:
IRRITATION.

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE IRRITATION, REDNESS, PAIN.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION.

INGESTION:
IRRITANT.

ACUTE EXPOSURE- ABDOMINAL SPASM, NAUSEA, VOMITING, DIARRHEA, DIURESIS, MARKED HYPOTENSION, FAINTNESS, MUSCLE SPASMS, CYANOSIS, CONVULSION, COLLAPSE, COMA, BLOOD DISORDERS, AND RESPIRATORY PARALYSIS ARE POSSIBLE.

FIRST AID- IF VICTIM IS CONSCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER, AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
MAY REACT WITH REDUCING AGENTS AND INCOMPATIBLE SUBSTANCES.

INCOMPATIBILITIES:
EXPLOSION: PHOSPHORUS.
EXPLOSION BY HEATING: ANTIMONY TRISULFIDE, METALS: POTASSIUM, TITANIUM, ANTIMONY, GERMANIUM, ZIRCONIUM, ZINC, ETC., METAL SULFIDES: SULFIDES OF ANTIMONY, BARIUM, CALCIUM, GERMANIUM, ETC., SODIUM THIOSULFATE, TRICOPPER DIPHOSPHIDE, TITANIUM DISULFIDE, SODIUM ACETATE AND TARTARATES, OXALATES AND CITRATES, BIS(TRICHLOROMETHYL)BENZENE.
EXPLOSION BY IMPACT: COPPER MONOPHOSPHIDE, LEAD PHOSPHITE, LEAD NITRATE.
EXPLOSION AFTER LONG CONTACT: TIN, SOLDER, TIN PLATE, STANNATES.
EXPLOSION ON DISSOLVING: SODIUM HYPOSULFITE.
POSSIBLE EXPLOSION: SODIUM PEROXIDE AND DEXTROSE.
VIOLENT OR INTENSE COMBUSTION: CARBON, COPPER PHOSPHIDE.
IGNITION: CALCIUM SILICIDE, BORON PHOSPHIDE.
INCANDESCENT COMBUSTION BY HEATING IN AIR: THORIUM CARBIDE.
FORMATION OF EXPLOSIVE MIXTURE: ARSENIC DISULFIDE, ARSENIC, SODIUM HYPOPHOSPHITE, SODIUM THIOSULFATE, SODIUM ACETATE, SULFUR AND DIARSENIC TRISULFIDE.
FORMATION OF PYROTECHNIC MIXTURE: CHARCOAL, SULFUR AND ARSENIC TRISULFIDE.
FORMATION OF IGNITABLE MIXTURE: CARBON, BORON, CALCIUM DISILICIDE.
INCANDESCENT REACTION: SELENIUM, TITANIUM.

DECOMPOSITION:
THERMAL DECOMPOSITION RELEASES FLAMMABLE OXYGEN AND TOXIC NITROGEN DIOXIDE.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****

CONDITIONS TO AVOID

MAY IGNITE OTHER COMBUSTIBLE MATERIALS (WOOD, PAPER, OIL, ETC.). REACTION WITH FUELS MAY BE VIOLENT. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

CONSULT NFPA PUBLICATION 43A, STORAGE OF LIQUID AND SOLID OXIDIZING MATERIALS, FOR STORAGE REQUIREMENTS.

****

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC) AWAY FROM SPILLED MATERIAL. DO NOT TOUCH SPILLED MATERIAL. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; MOVE CONTAINERS FROM SPILL AREA. FOR SMALL LIQUID SPILLS, TAKE UP WITH SAND, EARTH OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:
PROCESS ENCLOSURE, LOCAL EXHAUST, OR GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:
HIGH LEVELS- DUST MASK.

FIRE FIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

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(2)

MATERIAL SAFETY DATA SHEET
FOR COATINGS, RESINS, AND RELATED MATERIALS

"ESSENTIALLY SIMILAR" TO FORM OSHA-20

DATE OF PREP
7/27/84

* SECTION I *

MANUFACTURER'S NAME: BATAVIA COATINGS DIVISION
WHITTAKER CORPORATION
1500 LATHEM STREET
BATAVIA, IL 60510

EMERGENCY TELEPHONE NUMBER: (312) 879-6800
INFORMATION TELEPHONE NUMBER: (312) 879-6800

MANUFACTURERS CODE IDENTIFICATION: 32R34-2 6/21/84
PRODUCT FAMILY: VINYL COATING
TRADE NAME: 323 RED STOP OFF

* SECTION II - HAZARDOUS INGREDIENTS *

INGREDIENT	PERCENT BY WT.	TLV PPM	TLV MG/CU. M	LEL	VAPOR PRESSURE MM HG @ 20 DEG. C
METHYL ETHYL KETONE	41.68	200		2.0	70.00
ACETONE	24.96	1,000		2.6	186.00
PROPYLENE OXIDE	.22	100		2.1	442.00

* SECTION III - PHYSICAL DATA *

BOILING RANGE: 94 TO 176 DEG. F
EVAPORATION RATE: SLOWER THAN ETHER
VAPOR DENSITY: HEAVIER THAN AIR
% VOLATILE BY VOLUME: 79.06%
WEIGHT PER GALLON: 7.87

* SECTION IV - FIRE AND EXPLOSION HAZARD DATA *

FLAMMABILITY CLASSIFICATION: FLAMMABLE LIQUID - CLASS IC
LEL: SEE SECTION II
FLASHPOINT: 10 F

EXTINGUISHING MEDIA:
CARBON DIOXIDE, FOAM, DRY CHEMICAL

UNUSUAL FIRE AND EXPLOSION HAZARDS:
STORE BELOW 120 DEGREES FAHRENHEIT.

SPECIAL FIRE FIGHTING PROCEDURES:
WEAR SELF CONTAINED BREATHING APPARATUS.

C01359

* SECTION V - HEALTH HAZARD DATA *

THRESHOLD LIMIT VALUE: SEE SECTION II

EFFECTS OF OVEREXPOSURE:

ACUTE
HEADACHE, DIZZINESS, NAUSEA, SEVERE EYE IRRITATION ON CONTACT

CHRONIC

EMERGENCY AND FIRST AID PROCEDURES:
EYE CONTACT: FLUSH WITH WATER
SKIN CONTACT: WASH WITH SOAPY WATER
INHALATION: REMOVE TO FRESH AIR

* SECTION VI - REACTIVITY DATA *

STABILITY: STABLE CONDITIONS TO AVOID: N/A

INCOMPATABILITY - MATERIALS TO AVOID:
UNKNOWN

HAZARDOUS DECOMPOSITION PRODUCTS:

HAZARDOUS POLYMERIZATION WILL NOT OCCUR

CONDITIONS TO AVOID:
N/A

* SECTION VII - SPILL OR LEAK PROCEDURES *

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
REMOVE ALL SOURCES OF IGNITION. VENTILATE AREAS. REMOVE WITH INERT, ABSORBENT AND NON-SPARKING TOOLS.

WASTE DISPOSAL METHOD:
INCINERATE IN AN APPROVED FACILITY. DO NOT INCINERATE IN CLOSED CONTAINER.

* SECTION VIII - SPECIAL PROTECTION INFORMATION *

RESPIRATORY PROTECTION:
VENTILATE WORKING SPACES TO BELOW THRESHOLD LIMIT VALUE. IF LOCAL EXHAUST NOT AVAILABLE, USE BUREAU OF MINES APPROVED RESPIRATORY DEVICE SEE BUREAU OF MINES IC 8436. SUPT. OF DOCUMENTS.

VENTILATION:
LOCAL EXHAUST TO MAINTAIN VAPOR CONCENTRATION BELOW THRESHOLD LIMIT VALUE.

PROTECTIVE GLOVES:

REQUIRED FOR REPEATED OR PROLONGED CONTACT.

EYE PROTECTION:

PROTECTIVE GOGGLES OR MASK REQUIRED TO PROTECT AGAINST SPLASH.

OTHER PROTECTIVE EQUIPMENT:

EYE BATH RECOMMENDED.

* SECTION IX - SPECIAL PRECAUTIONS *

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
STORE BELOW 120 DEGREES FAHRENHEIT.

DOL STORAGE CATEGORY: OSHA CLASSIFICATION 29 CFR 1910.106(A) PARTS 18-19. REFER TO SECTION IV.

OTHER PRECAUTIONS:
AVOID EXPOSURE TO VAPORS. GROUND CONTAINER WHILE POURING, MINIMIZE DISTANCE OF FREE FALL TO AVOID STATIC ELECTRICITY GENERATION.

NOTE: PERCENTAGES SHOWN IN SECTION II AS .00% MAY OR MAY NOT BE PRESENT IN TRACE AMOUNTS DUE TO NORMAL VARIATION IN RAW MATERIALS OR MANUFACTURING PROCESS.

SPARKLEEN 04-320(-1,-3)

Form Approved
OMB No. 44-R1387

CALGON
SUBSIDIARY OF MERCK & CO., INC.

Sparkleen

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME: CALGON COMMERCIAL DIVISION	EMERGENCY TELEPHONE NO.: (314) 862-2000
ADDRESS (Number, Street, City, State, and ZIP Code): 7501 PAGE AVE, ST. LOUIS, MISSOURI 63166	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS: Sparkleen
CHEMICAL FAMILY	FORMULA: Multi-Component Mixture

SECTION II - HAZARDOUS INGREDIENTS

	%	TLV (Units)
Sodium Hexametaphosphate	44.5 %	
Sodium Bicarbonate	30.0 %	
Sodium Carbonate	15.0 %	
Nonylphenoxypoly (ethyleneoxy) ethanol	1.5 %	
Sodium Alkyl Aryl Sulfonate - 40% Active	4.0 %	
Sodium Sulfate	6.0 %	

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H_2O=1)	N/A
VAPOR PRESSURE (mm Hg.)	N/A	PERCENT, VOLATILE BY VOLUME (%)	N/A
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____=1)	N/A
SOLUBILITY IN WATER	Complete	pH (1%)	9.3 - 9.8
APPEARANCE AND ODOR	White, granular, free flowing solid.		

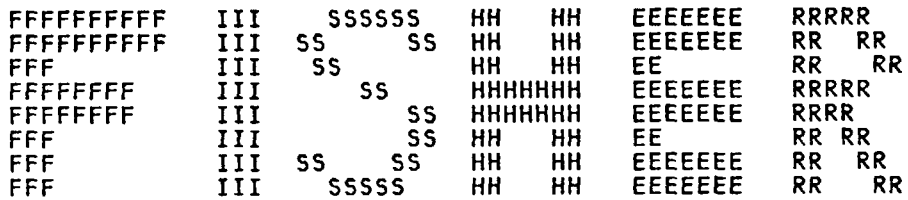
SECTION IV - FIRE AND EXPLOSION HAZARD DATA

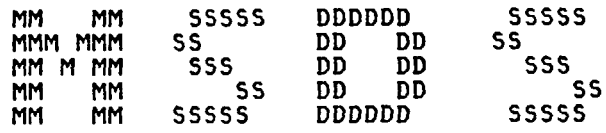
FLASH POINT (Method used): Not Flammable	FLAMMABLE LIMITS: Non-flammable	LEL	UEL
EXTINGUISHING MEDIA: Product is not flammable			
SPECIAL FIRE FIGHTING PROCEDURES: Exercise caution when fighting any chemical fire. Respiratory protection is essential.			
UNUSUAL FIRE AND EXPLOSION HAZARDS: None			

C01360

Only ingredients exhibiting a particular hazard will be listed on this form. Chemicals not classified as hazardous according to OSHA Guidelines as they are specified in 29 CFR, 1915.2 or 1916.2 will not be listed although one or more may be a constituent of this product.

FB





CAT NBR	DESCRIPTION
04320	SPARKLEEN I MAN WASH 31/4

IMPORTANT SAFETY INFORMATION -- DO NOT DISCARD.

PLEASE ROUTE TO COMPANY SAFETY OFFICER.

FISHER SCIENTIFIC HAS A COMPLETE LINE OF SAFETY PRODUCTS AND INFORMATION FOR THE LABORATORY. CONTACT YOUR LOCAL FISHER BRANCH FOR FILMS, BROCHURES, CATALOGS AND PRODUCTS.

CERRO COPPER & BRASS CO
HGWY 3 ALTON & SRN TRACKS
SAUGET ILL 62004
P P E ST LOUIS ILL 62202

IF NAME AND/OR ADDRESS HAVE CHANGED, CONTACT YOUR FISHER SALES REPRESENTATIVE OR YOUR LOCAL FISHER BRANCH.

REQUIRED MATERIAL SAFETY DATA SHEETS (MSDS) NOT INCLUDED IN THIS MAILING WILL FOLLOW UNDER SEPARATE COVER.
THIS PACKET MAY CONTAIN MSDS FOR PRODUCTS MANUFACTURED BY OTHERS AND DISTRIBUTED BY FISHER SCIENTIFIC COMPANY. THESE MSDS WERE PREPARED BY THE MANUFACTURER AND FISHER DISCLAIMS ALL LIABILITY FOR THE CONTENT.

Sulfuric Acid

J. T. BAKER CHEMICAL CO. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

So234 -01 SULFURIC ACID PAGE: 1
EFFECTIVE: 10/08/85 ISSUED: 01/24/86

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: SULFURIC ACID
FORMULA: H2SO4
FORMULA WT: 98.08
CAS NO.: 07664-93-9
NIOSH/RTECS NO.: WS5600000
COMMON SYNONYMS: OIL OF VITRIOL
PRODUCT CODES: 5030,9691,9675,9340,9679,9674,9636,9631,5374,9688,9673,5432
5137,9635,4802,9684,9683,5643,9630,9694

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	(POISON)
FLAMMABILITY	-	0	
REACTIVITY	-	3	(WATER REACTIVE)
CONTACT	-	4	(CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
CAUSES SEVERE BURNS
MAY BE FATAL IF SWALLOWED
DO NOT GET IN EYES, ON SKIN, OR CLOTHING.
AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SECTION II - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SULFURIC ACID	90-100	7664-93-9

SECTION III - PHYSICAL DATA

BOILING POINT: 290 C (554 F) VAPOR PRESSURE(MM HG): N/A

MELTING POINT: 3 C (37 F) VAPOR DENSITY(AIR=1): 3.4

SPECIFIC GRAVITY: 1.84 (H2O=1) EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: N/A

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C01361

SECTION III - PHYSICAL DATA (CONTINUED)

APPEARANCE & ODOR: CLEAR, COLORLESS TO LIGHT YELLOW, OILY ODORLESS LIQUID.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A NFPA 704M RATING: 3-0-2 W

FIRE EXTINGUISHING MEDIA
USE DRY CHEMICAL OR CARBON DIOXIDE. DO NOT USE WATER.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE DO NOT GET WATER INSIDE CONTAINERS.

UNUSUAL FIRE & EXPLOSION HAZARDS
A VIOLENT EXOTHERMIC REACTION OCCURS WITH WATER. SUFFICIENT HEAT MAY BE PRODUCED TO IGNITE COMBUSTIBLE MATERIALS.

TOXIC GASES PRODUCED
SULFUR DIOXIDE

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1 MG/M3 (PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 2140

EFFECTS OF OVEREXPOSURE
LIQUID MAY CAUSE SEVERE BURNS TO SKIN AND EYES.
INHALATION OF VAPORS MAY CAUSE COUGHING, CHEST PAINS, DIFFICULTY BREATHING OR UNCONSCIOUSNESS.
INGESTION MAY BE FATAL.

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE

CONTINUED ON PAGE: 3

SECTION VI - REACTIVITY DATA (CONTINUED)

INCOMPATIBLES: WATER, MOST COMMON METALS, ORGANIC MATERIALS, STRONG REDUCING AGENTS, COMBUSTIBLE MATERIALS, STRONG BASES

DECOMPOSITION PRODUCTS: OXIDES OF SULFUR

SECTION VII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
STOP LEAK IF YOU CAN DO SO WITHOUT RISK. DO NOT USE WATER.
NEUTRALIZE SPILL AND/OR WASHINGS WITH SODA ASH OR LIME.
WITH CLEAN SHOVEL, PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER.
MOVE CONTAINER(S) FROM SPILL AREA.

J. T. BAKER NEUTRASORB(R) OR NEUTRASOL(R) "LOW NA+" ACID NEUTRALIZERS ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

SECTION VIII - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE APPROPRIATE VENTILATION CONDITIONS EXIST. IF THE TLV IS EXCEEDED, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA.
KEEP CONTAINERS OUT OF SUN AND AWAY FROM HEAT.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

CONTINUED ON PAGE: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

PROPER SHIPPING NAME	SULFURIC ACID
HAZARD CLASS	CORROSIVE MATERIAL (LIQUID)
UN/NA	UN1830
LABELS	CORROSIVE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.D.G.)

PROPER SHIPPING NAME	SULPHURIC ACID
HAZARD CLASS	8
UN/NA	UN1830
LABELS	CORROSIVE

(TM) AND (R) DESIGNATE TRADEMARKS.
N/A = NOT APPLICABLE OR NOT AVAILABLE

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND DATA PRESENTED IN VARIOUS TECHNICAL PUBLICATIONS. IT IS E USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR E ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

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Sulfuric Acid

SULFURIC ACID
SULFURIC ACID
SULFURIC ACID

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 01/31/86
PO NBR: N/A
ACCT: 133918-01
INDEX: 02-8602-90422
CAT NO: A300C212

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7664-93-9

SUBSTANCE: **SULFURIC ACID**

TRADE NAMES/SYNONYMS: OIL OF VITRIOL; BOV; DIPPING ACID; VITRIOL BROWN OIL; HYDROGEN SULFATE; NORDHAUSEN ACID; A-300; A-300C; A-300-SI; A-300S; A-298; SO-A-172; SO-A-174

CHEMICAL FAMILY:
INORGANIC ACID

MOLECULAR FORMULA: H2-S-O4 MOL WT: 98.07

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=2 PERSISTENCE=0

COMPONENTS AND CONTAMINANTS

PERCENT: 98 COMPONENT: SULFURIC ACID

PERCENT: 2 COMPONENT: WATER

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS:
1 MG/M3 OSHA TWA; 1 MG/M3 ACGIH TWA;
1 MG/M3 NIOSH RECOMMENDED TWA

PHYSICAL DATA

DESCRIPTION: COLORLESS TO DARK BROWN OILY LIQUID

BOILING POINT: 536 F (280 C) MELTING POINT: 37 F (3 C)

SPECIFIC GRAVITY: 1.8 VAPOR PRESSURE: 0.001 @ 20 C

C01362

Sulfuric Acid

SOLUBILITY IN WATER: SOLUBLE SOLVENT SOLUBILITY: DECOMPOSES IN ALCOHOL

ODOR THRESHOLD: 1 MG/M3 VAPOR DENSITY: 3.4

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-FLAMMABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL OR CARBON DIOXIDE
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, FLOOD AREA WITH WATER FROM A DISTANCE
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH USING AGENTS INDICATED; DO NOT USE WATER DIRECTLY ON MATERIAL. IF LARGE AMOUNTS OF COMBUSTIBLE MATERIALS ARE INVOLVED, USE WATER SPRAY OR FOG IN FLOODING AMOUNTS. USE WATER SPRAY TO ABSORB CORROSIVE VAPORS. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS; KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TOXICITY

135 MG/KG UNKNOWN-MAN LDLO; 2140 MG/KG ORAL-RAT LD50; 18 MG/M3/8 HOURS INHALATION-GUINEA PIG LC50; CARCINOGEN STATUS: NONE.
SULFURIC ACID IS A SEVERE EYE, PULMONARY, AND SKIN IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CORROSIVE/TOXIC. 80 MG/M3 IS IMMEDIATELY DANGEROUS TO LIFE AND HEALTH.
ACUTE EXPOSURE- EXPOSURE TO CONCENTRATIONS CONTAINING 5 MG/M3 MAY CAUSE NOSE AND THROAT IRRITATION, HEADACHE, COUGH, AN INCREASE IN RESPIRATORY RATE OR IMPAIRMENT OF VENTILATORY CAPACITY. DELAYED SYMPTOMS MAY INCLUDE INCLUDE PULMONARY EDEMA, TIGHTNESS IN THE CHEST, CYANOSIS, HYPOTENSION, BRONCHITIS, OR EMPHYSEMA.

CHRONIC EXPOSURE- REPEATED EXPOSURE TO THE MIST CAUSES CHRONIC TRACHEO-BRONCHITIS, EROSION AND DISCOLORATION OF THE TEETH, BRONCHIAL PNEUMONIA, OR GASTROINTESTINAL DISTURBANCES.

SKIN CONTACT:
CORROSIVE.
ACUTE EXPOSURE- CONTACT MAY CAUSE SEVERE IRRITATION AND PAIN, BURNS, AND VESICULATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO THE LIQUID OR MIST MAY CAUSE IRRITATION AND DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS, (APPROXIMATELY 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER THE AREAS WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION.

EYE CONTACT:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT WITH THE CONCENTRATED ACID SOLUTION MAY CAUSE SEVERE DAMAGE, OFTEN LEADING TO BLINDNESS. DILUTE SOLUTIONS PRODUCE MORE TRANSIENT EFFECTS FROM WHICH RECOVERY MAY BE COMPLETE. EXPOSURE TO THE MIST CAUSES EYE IRRITATION AND LACRIMATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS, AND LACRIMATION.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). IN CASE OF BURNS, APPLY STERILE BANDAGES LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION.

INGESTION:
CORROSIVE.
ACUTE EXPOSURE- SEVERE BURNING PAIN IN THE MOUTH, THROAT, AND ABDOMEN FOLLOWED BY VOMITING AND DIARRHEA OF DARK, PRECIPITAED BLOOD. ASPHYXIA MAY OCCUR FROM SWELLING OF THE THROAT. PERFORATION OF THE ESOPHAGUS AND STOMACH MAY OCCUR.

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ACID. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
VIOLENT EXOTHERMIC REACTION WITH WATER AND ORGANIC MATERIALS. MAY IGNITE FINELY DIVIDED COMBUSTIBLE MATERIALS ON CONTACT.

INCOMPATIBILITIES:
ACETIC ANHYDRIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ACETONE CYANHYDRIN: POSSIBLE EXPLOSION.
ACETONE AND NITRIC ACID: ACETONE WILL DECOMPOSE VIOLENTLY WHEN BROUGHT IN CONTACT WITH MIXED SULFURIC-NITRIC ACIDS.
ACETONE AND POTASSIUM DICHROMATE: IGNITION.
ACETONITRILE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ACROLEIN: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ACRYLONITRILE: VIGOROUS EXOTHERMIC REACTION.
ALCOHOLS AND HYDROGEN PEROXIDE: POSSIBLE EXPLOSION.
ALLYL ALCOHOL: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.

ALLYL CHLORIDE: ALLYL CHLORIDE MAY VIOLENTLY POLYMERIZE.
2-AMINOETHANOL: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
AMMONIUM HYDROXIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
AMMONIUM TRIPERCHROMATE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ANILINE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
BROMATES AND METALS: POSSIBLE IGNITION AND FIRE.
BROMINE PENTAFLUORIDE: VIOLENT REACTION.
N-BUTYRALDEHYDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
CARBIDES: CONCENTRATED SULFURIC ACID IS EXTREMELY HAZARDOUS IN CONTACT WITH CARBIDES.
CESIUM ACETYLENE CARBIDE: IGNITION.
CHLORATES: ALL CHLORATES, WHEN BROUGHT IN CONTACT WITH SULFURIC ACID MAY GIVE OFF EXPLOSIVE CHLORINE DIOXIDE GAS. A VIOLENT EXPLOSION IS USUAL.
CHLORATES AND METALS: IGNITION LIKELY.
CHLORINE TRIFLUORIDE: VIOLENT EXPLOSION.
CHLOROSULFONIC ACID: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
CUPROUS NITRIDE: VIOLENT REACTION.
DIISOBUTYLENE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
DIMETHYLBENZYLCARBINOL AND HYDROGEN PEROXIDE: EXPLOSION.
EPICHLOROHYDRIN: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ETHANOL AND HYDROGEN PEROXIDE: POSSIBLE EXPLOSION.
ETHYLENE CYANOHYDRIN: VIOLENT REACTION.
ETHYLENE DIAMINE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ETHYLENE GLYCOL: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ETHYLENIMINE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
FULMINATES: SULFURIC ACID IS EXTREMELY HAZARDOUS IN CONTACT WITH FULMINATES.
HYDROCHLORIC ACID: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
HYDROFLUORIC ACID: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
IODINE HEPTAFLUORIDE: THE ACID BECOMES EFFERVESCENT.
INDANE AND NITRIC ACID: POSSIBLE EXPLOSION.
IRON: POSSIBLE EXPLOSION DUE TO HYDROGEN GAS FROM THE ACID-METAL REACTION.
ISOPRENE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMP. & PRESSURE.
LITHIUM SILICIDE: INCANDESCENT REACTION.
MERCURIC NITRIDE: EXPLOSION.
MESITYL OXIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
METALS (POWDERED): CONTACT WITH SULFURIC ACID IS EXTREMELY HAZARDOUS.
NITRIC ACID AND GLYCERIDES: EXPLOSION.
P-NITROTOLUENE: EXPLOSION.
PENTASILVER TRIHYDROXYDIAMINOPHOSPHATE: EXPLOSION.
PERCHLORATES: POSSIBLE EXPLOSION.
PERCHLORIC ACID: FORMATION OF DANGEROUS ANHYDROUS PERCHLORIC ACID.
PERMANGANATES AND BENZENE: POSSIBLE EXPLOSION.
1-PHENYL-2-METHYL-PROPYL ALCOHOL AND HYDROGEN PEROXIDE: POSSIBLE EXPLOSION.
PHOSPHORUS: YELLOW PHOSPHORUS IGNITES WHEN PLACED IN BOILING CONCENTRATED

SULFURIC ACID.
PHOSPHORUS ISOCYANATE: VIOLENT REACTION.
PICRATES: CONTACT WITH CONCENTRATED SULFURIC ACID IS EXTREMELY HAZARDOUS.
POTASSIUM TERT-BUTOXIDE: IGNITION.
POTASSIUM CHLORATE: POSSIBLE FIRE AND EXPLOSION.
POTASSIUM PERMANGANATE: POSSIBLE EXPLOSION IN THE PRESENCE OF MOISTURE.
POTASSIUM PERMANGANATE AND POTASSIUM CHLORIDE: VIOLENT EXPLOSION.
BETA-PROPIOLACTONE: MIXTURES IN CLOSED CONTAINERS CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
PROPYLENE OXIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
PYRIDINE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
RUBIDIUM ACETYLENE CARBIDE: BURNS WITH SULFURIC ACID.
SILVER PERMANGANATE: EXPLOSION.
SODIUM: REACTS WITH EXPLOSIVE VIOLENCE.
SODIUM CARBONATE: VIOLENT REACTION.
SODIUM CHLORATE: POSSIBLE FIRE OR EXPLOSION.
SODIUM HYDROXIDE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
STEEL: POSSIBLE EXPLOSION DUE TO HYDROGEN GAS FROM THE ACID-METAL REACTION.
STYRENE MONOMER: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
TOLUENE AND NITRIC ACID: VIOLENT REACTION.
VINYL ACETATE: MIXING IN A CLOSED CONTAINER CAUSED AN INCREASE IN TEMPERATURE AND PRESSURE.
ZINC CHLORATE: LIKELY TO CAUSE FIRES AND EXPLOSIONS.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS INCLUDE HIGHLY TOXIC FUMES OF SULFUR OXIDES.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****

CONDITIONS TO AVOID

MAY IGNITE OTHER COMBUSTIBLE MATERIALS (WOOD, PAPER, OIL, ETC.). VIOLENT REACTION WITH WATER. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN CONFINED SPACES. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

****

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

—DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS.

NEUTRALIZE SPILL WITH SLAKED LIME, SODIUM BICARBONATE OR CRUSHED LIMESTONE.

—AIR SPILL:
—KNOCK DOWN VAPORS WITH WATER SPRAY. KEEP UPWIND.

WATER SPILL:
NEUTRALIZE WITH AGRICULTURAL LIME, SLAKED LIME, CRUSHED LIMESTONE, OR SODIUM BICARBONATE.

ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL. DO NOT TOUCH SPILLED MATERIAL. DO NOT GET WATER INSIDE CONTAINER. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. DO NOT PUT WATER ON LEAK OR SPILL AREA. CLEAN UP ONLY UNDER THE SUPERVISION OF AN EXPERT. DIKE SPILL FOR LATER DISPOSAL. DO NOT APPLY WATER UNLESS DIRECTED TO DO SO. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:

50 MG/M3-	GAS MASK WITH A CHIN-STYLE, FRONT, OR BACK-MOUNTED ACID GAS CANISTER AND A HIGH-EFFICIENCY PARTICULATE FILTER.
	HIGH-EFFICIENCY PARTICULATE RESPIRATOR WITH A FULL FACEPIECE.
	SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE, HELMET, OR HOOD.
	SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
100 MG/M3-	TYPE C SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET, OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.
ESCAPE-	GAS MASK WITH A CHIN-STYLE, FRONT, OR BACK-MOUNTED ACID GAS CANISTER AND A HIGH-EFFICIENCY PARTICULATE FILTER.
	SELF-CONTAINED BREATHING APPARATUS.
FIREFIGHTING-	SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
WEAR APPROPRIATE PROTECTIVE CLOTHING TO AVOID ANY POSSIBILITY OF SKIN CONTACT WITH LIQUIDS CONTAINING MORE THAN 1% SULFURIC ACID. AVOID REPEATED OR PROLONGED SKIN CONTACT WITH LIQUIDS CONTAINING 1% OR LESS SULFURIC ACID.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

CREATION DATE: 01/11/85 REVISION DATE: 09/05/85

-ADDITIONAL INFORMATION-

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ZINC REFERENCE SOLUTION 1,000 PPM ZN
ZINC REFERENCE SOLUTION 1,000 PPM ZN
ZINC REFERENCE SOLUTION 1,000 PPM ZN

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 04/09/86
PO NBR: N/A
ACCT: 133918-01
INDEX: 02-8609-70501
CAT NO: SZ13500

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **ZINC REFERENCE SOLUTION 1,000 PPM ZN**

TRADE NAMES/SYNONYMS: OHS40209

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

PERCENT: 6.5 COMPONENT: NITRIC ACID H-N-03
CAS 7697-37-2

PERCENT: 93.4 COMPONENT: WATER

PERCENT: 0.1 COMPONENT: ZINC OXIDE ZN-O
CAS 1314-13-2

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
NITRIC ACID:
2 PPM (5 MG/KG) OSHA TWA; 2 PPM ACGIH TWA; 4 PPM ACGIH STEL;
2 PPM NIOSH RECOMMENDED TWA

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID BOILING POINT: 212 F (100 C)

MELTING POINT: 32 F (0 C) SPECIFIC GRAVITY: 1.1

VAPOR PRESSURE: 14 MMHG (WATER) EVAPORATION RATE: (ETHER = 1) >1

PH: ACIDIC SOLUBILITY IN WATER: MISCIBLE VAPOR DENSITY: 0.7 (WATER)

C01363

Zinc Reference Solution

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NONFLAMMABLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH USING AGENTS INDICATED; DO NOT USE WATER DIRECTLY ON MATERIAL. IF LARGE AMOUNTS OF COMBUSTIBLE MATERIALS ARE INVOLVED, USE WATER SPRAY OR FOG IN FLOODING AMOUNTS. USE WATER SPRAY TO ABSORB CORROSIVE VAPORS. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS; KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
CORROSIVE MATERIAL

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.402:
CORROSIVE

TOXICITY

NITRIC ACID: 430 MG/KG ORAL-HUMAN LDLO; 110 MG/KG UNKNOWN-MAN LDLO;
CARCINOGEN STATUS: NONE; TOXIC AND SEVERE EYE, SKIN AND MUCOUS MEMBRANE IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CORROSIVE.
100 PPM IS IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE
NITRIC ACID: MAY CAUSE COUGHING, HEADACHE, DIZZINESS, AND WEAKNESS. DELAYED SYMPTOMS MAY INCLUDE DRYNESS OF THE THROAT AND NOSE, CHEST PAIN OR TIGHTNESS, DYSPNEA, FROTHY SPUTUM, HYPOTENSION AND CYANOSIS FOLLOWED BY PNEUMONITIS AND PULMONARY EDEMA, WHICH MAY BE FATAL. IF PATIENT RECOVERS, SCAR TISSUE MAY CAUSE STRICTURE OF THE PYLORUS OR ESOPHAGUS.

CHRONIC EXPOSURE
NITRIC ACID: REPEATED OR PROLONGED EXPOSURE MAY CAUSE DENTAL EROSION

FOLLOWED BY JAW NECROSIS, CHRONIC COUGH AND BRONCHITIS OR CHEMICAL PNEUMONITIS AND GASTROINTESTINAL DISTURBANCES.

FIRST AID: REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
CORROSIVE.
ACUTE EXPOSURE
NITRIC ACID: DIRECT CONTACT WITH THE LIQUID OR CONCENTRATED VAPOR CAUSES IMMEDIATE SEVERE AND PENETRATING BURNS, STAINING THE SKIN YELLOW OR YELLOWISH-BROWN. DILUTE SOLUTIONS PRODUCE MILD IRRITATION AND HARDEN THE SKIN WITHOUT DESTROYING IT.

CHRONIC EXPOSURE
NITRIC ACID: REPEATED OR PROLONGED EXPOSURE MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
CORROSIVE.
ACUTE EXPOSURE
NITRIC ACID: DIRECT CONTACT WITH THE LIQUID MAY CAUSE PAIN, PHOTOPHOBIA, TEARING, EDEMA, CORNEAL ULCERATION, SEVERE BURNS, AND NECROSIS OF THE DEEPER TISSUES WITH PERMANENT DAMAGE.

CHRONIC EXPOSURE
NITRIC ACID: REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF BURNS, APPLY STERILE BANDAGES LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
CORROSIVE/TOXIC.
ACUTE EXPOSURE
NITRIC ACID: IMMEDIATE PAIN IN THE MOUTH, THROAT, AND STOMACH MAY BE FOLLOWED BY NAUSEA, VOMITING, DIARRHEA, HEMATEMESIS, HEMOPTYSIS, HYPOTENSION, NEPHRITIS, ALBUMINURIA, OLIGURIA, ANURIA, HEMATURIA, AND POSSIBLY CIRCULATORY COLLAPSE. ASPHYXIA FROM GLOTTAL EDEMA IS POSSIBLE. BURNS OF THE GASTROINTESTINAL TRACT MAY BE SEVERE ENOUGH TO CAUSE PERFORATION OF THE ESOPHAGUS AND STOMACH WHICH MAY BE FOLLOWED BY MEDIASTINITIS OR PERITONITIS, INDICATED BY FEVER.

CHRONIC EXPOSURE
NITRIC ACID: NOT REPORTED TO OCCUR IN HUMANS.

FIRST AID- DO NOT USE GASTRIC LAVAGE OR EMESIS. DILUTE THE ACID IMMEDIATELY BY DRINKING LARGE QUANTITIES OF WATER OR MILK. IF VOMITING PERSISTS, AD-

MINISTER FLUIDS REPEATEDLY. INGESTED ACID MUST BE DILUTED APPROXIMATELY 100 TIMES TO RENDER IT HARMLESS TO TISSUES. (DRIESBACH, HANDBOOK OF POISONING, 11TH ED.) GET MEDICAL ATTENTION.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

ACETIC ACID: EXPLOSIVE REACTION IF NOT KEPT COLD.
ACETIC ANHYDRIDE: EXPLOSIVE REACTION IF NOT KEPT COLD.
ACETONE AND ACETIC ACID: EXPLOSIVE REACTION.
ACETYLENE: YIELDS TRINITROMETHANE, WHICH MELTS AT 15 C; LIQUID IS EXPLOSIVE.
ACRYLONITRILE: EXPLOSIVE REACTION AT 90 C
ARSINE: EXPLOSIVE REACTION.
CESIUM CARBIDE: EXPLOSIVE REACTION.
4-CHLORO-2-NITROANILINE: FORMS EXPLOSIVE COMPOUND.
ACETONITRILE: EXPLOSIVE REACTION.
CUPRIC NITRIDE: EXPLOSIVE REACTION.
CYCLOHEXYLAMINE: FORMS EXPLOSIVE SOLUTION.
1,2-DIAMINOETHANE BISTRIMETHYL GOLD: EXPLOSIVE REACTION.
2,6-DI-T-BUTYL PHENOL: FORMS EXPLOSIVE COMPOUND.
DICHLOROMETHANE: FORMS EXPLOSIVE SOLUTION.
DINITROTOLUENE: EXPLOSIVE REACTION.
DIPHENYL DISTIBENE: EXPLOSIVE OXIDATION.
ETHANOL AND SILVER: FORMS EXPLOSIVE PRODUCT.
5-ETHYL-2-METHYL PYRIDINE: EXPLOSIVE REACTION.
5-ETHYL-2-PICOLINE: FORMS EXPLOSIVE COMPOUND.
CYCLOPENTADIENE: EXPLOSIVE REACTION.
BENZENE OR TOLUENE: EXPLOSIVE REACTION.
HYDROGEN PEROXIDE AND KETONES: FORMS EXPLOSIVE PRODUCTS.
HYDROGEN PEROXIDE AND MERCURIC OXIDE: FORMS EXPLOSIVE PRODUCTS.
HYDROGEN PEROXIDE AND THIUREA: FORMS EXPLOSIVE COMPOUND.
METAL SALICYCLATES: FORMS EXPLOSIVE COMPOUNDS.
4-METHYLCYCLOHEXANONE: EXPLOSIVE REACTION.
NITRO AROMATIC HYDROCARBONS: FORMS HIGHLY EXPLOSIVE PRODUCTS.
NITROBENZENE AND WATER: EXPLOSIVE REACTION.
NITROMETHANE: EXPLOSIVE REACTION.
NON-METAL OXIDES (ARSINE, PHOSPHINE, TETRABORANE): EXPLOSIVE REACTION.
PHENYLORTHOPHOSPHORIC ACID DISODIUM SALT: FORMS EXPLOSIVE PRODUCT.
POLYDIBROMOSILANES: EXPLOSIVE REACTION.
STIBINE: EXPLOSIVE REACTION.
SULFUR DIOXIDE: EXPLOSIVE REACTION.
THIOCYANIC ACID METAL SALTS: EXPLOSIVE REACTION.
THIOPHENES: EXPLOSIVE REACTION.
TITANIUM: FORMS EXPLOSIVE COMPOUND.
TETRABORANE: EXPLOSIVE REACTION.
TRICADIUM DIPHOSPHIDE: EXPLOSIVE REACTION.
TRITHIOACETONE: EXPLOSIVE REACTION.
HYDROGEN TELLURIDE: EXPLOSIVE REACTION.
INDANE AND SULFURIC ACID: EXPLOSIVE REACTION.
MAGNESIUM: EXPLOSIVE REACTION.
NITROBENZENE: EXPLOSIVE REACTION.
PHOSPHOROUS TRICHLORIDE: EXPLOSIVE REACTION.
PHTHALIC ANHYDRIDE: EXOTHERMIC REACTION AND FORMS EXPLOSIVE PRODUCTS.

POTASSIUM HYPOPHOSPHITE: EXPLOSIVE REACTION.
RUBIDIUM CARBIDE: EXPLOSIVE REACTION.
SELENIUM IODOPHOSPHIDE: EXPLOSIVE REACTION.
SILVER AND ETHYL ALCOHOL: EXPLOSIVE REACTION.
TETRABORON DECAHYDRIDE: EXPLOSIVE REACTION.
THIOCYANATES: EXPLOSIVE REACTION.
SULFURIC ACID AND GLYCERIDES: EXPLOSIVE REACTION.
TRIAZINE: EXPLOSIVE REACTION.
UNSYMMETRICAL DIMETHYL HYDRAZINE: EXPLOSIVE REACTION.
URANIUM: EXPLOSIVE REACTION.
URANIUM-NEODYMIUM ALLOY: EXPLOSIVE REACTION.
URANIUM-NEODYMIUM-ZIRCONIUM ALLOY: EXPLOSIVE REACTION.
ZIRCONIUM-URANIUM ALLOYS: EXPLOSIVE REACTION.
BORON DECAHYDRATE: EXPLOSIVE REACTION.
2-AMINOTHIAZOLE AND SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
BENZOTHIAPHENE DERIVATIVES: FORMATION OF POSSIBLY EXPLOSIVE COMPOUNDS.
CYANATES: POSSIBLE EXPLOSIVE REACTION.
1,3-CYCLOPENTADIENE: POSSIBLE EXPLOSIVE REACTION.
LACTIC ACID AND HYDROGEN FLUORIDE: POSSIBLE EXPLOSIVE REACTION.
MESITYLENE: POSSIBLE EXPLOSIVE REACTION.
ORGANIC SUBSTANCES AND PERCHLORATES: POSSIBLE EXPLOSION.
ORGANIC SUBSTANCES AND SULFURIC ACID: POSSIBLE EXPLOSION.
PHTHALIC ACID AND SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
REDUCING AGENTS: POSSIBLE EXPLOSIVE OR IGNITION REACTION.
SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
TITANIUM ALLOY: POSSIBLE EXPLOSIVE REACTION.
TITANIUM-MAGNESIUM ALLOY: POSSIBLE EXPLOSION ON IMPACT.
FLUORINE: POSSIBLE EXPLOSIVE REACTION.
METALS: VIOLENT REACTION WITH EXPLOSION OR IGNITION.
METAL CARBIDES: EXPLOSIVE OR VIOLENT REACTION.
TOLUENE AND SULFURIC ACID: EXTREMELY VIOLENT REACTION.
ACETONE AND SULFURIC ACID: VIOLENT DECOMPOSITION.
ANION EXCHANGE RESINS: POSSIBLE VIOLENT EXOTHERMIC REACTION.
ANTIMONY: VIOLENT REACTION.
BORON: VIOLENT REACTION WITH INCANDESCENCE.
CARBON (PULVERIZED): VIOLENT REACTION.
BUTANE THIOL: VIOLENT DECOMPOSITION.
CROTONALDEHYDE: VIOLENT DECOMPOSITION WITH IGNITION.
CUPROUS NITRIDE: VIOLENT REACTION.
CYCLIC KETONES: VIOLENT REACTION.
CYCLOHEXANOL: VIOLENT REACTION.
ETHANOL: VIOLENT REACTION.
GERMANIUM: VIOLENT REACTION.
HYDRAZINE: VIOLENT REACTION.
PHENYL ACETYLENE AND 1,1-DIMETHYLHYDRAZINE: VIOLENT REACTION.
PHOSPHINE: VIOLENT DECOMPOSITION.
SULFUR HALIDES: VIOLENT REACTION.
SULFURIC ACID AND TEREPHTHALIC ACID: VIOLENT REACTION.
THIOALDEHYDES OR THIOKETONES: VIOLENT REACTION.
URANIUM ALLOY: VIOLENT REACTION.
CYCLOHEXANONE: VIOLENT REACTION.
NEODYMIUM PHOSPHIDE: VIOLENT REACTION.
SULFAMIC ACID: VIOLENT REACTION.
AMMONIA (GAS): BURNS IN AN ATMOSPHERE OF NITRIC ACID VAPOR.
ANILINE: IGNITES SPONTANEOUSLY.
BORON PHOSPHIDE: IGNITION REACTION WITH POSSIBLE DEFLAGRATION.
BROMINE PENTAFLUORIDE: IGNITON REACTION.
CALCIUM HYPOPHOSPHITE: IGNITION REACTION.

N-BUTYL MERCAPTAN: IGNITION REACTION.
DIPHENYL TIN: IGNITION REACTION.
M-ETHYL ANILINE: IGNITION REACTION.
ETHYL PHOSPHINE: IGNITION REACTION.
FURFURYL ALCOHOL: IGNITION REACTION.
HALOGEN PHOSPHIDES: IGNITION REACTION.
HYDROGEN IODIDE: IGNITION REACTION.
PHOSPHONIUM IODIDE: IGNITION REACTION.
PHOSPHOROUS: IGNITION REACTION.
SODIUM: SPONTANEOUS IGNITION.
TOLUIDENE: IGNITION REACTION.
TRIETHYLGALLIUM MONOETHYL ETHER COMPLEX: IGNITION REACTION.
LITHIUM: IGNITION REACTION.
DIBURANE: SPONTANEOUS IGNITION.
TERPENES: SPONTANEOUS IGNITION.
ANION EXCHANGE RESINS AND DICHROMATE: POSSIBLE IGNITION REACTION.
CELLUSOSE: FORMS EASILY COMBUSTIBLE ETHER.
AROMATIC AMINES: POSSIBLE IGNITION REACTION.
DIVINYL ETHER: POSSIBLE IGNITION REACTION.
DIENE OR ACETYLENE DERIVATIVES: POSSIBLE IGNITION REACTION.
HYDROGNE SULFIDE: INCANDESCENT REACTION.
SELENIUM HYDRIDE: IGNITION OR INCANDESCENT REACTION.
FERROUS OXIDE (POWDER): INCANDESCENT REACTION.
LITHIUM SILICIDE: INCANDESCENT REACTION.
MAGNESIUM PHOSPHIDE: INCANDESCENT REACTION.
ZINC: INCANDESCENT REACTION.
BISMUTH (POWDERED): INTENSE EXOTHERMIC REACTION.
DIETHYL ETHER: INTENSE REACTION.
P-XYLENE: INTENSE REACTION IN PRESENCE OF SULFURIC ACID.
POLYALKENES: INTENSE REACTION.
SELENIUM: INTENSE REACTION.
TOLUENE: INTENSE REACTION.
TRIMETHYLTRIOXANE: INTENSE REACTION.
PHOSPHOROUS TETRAIODIDE: VIGOROUS REACTION.
HYDRAZOIC ACID: ENERGETIC REACTION.
SODIUM AZIDE: ENERGETIC REACTION.
ALLYL ALCOHOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ALLYL CHLORIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
2-AMINOETHANOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
AMMONIUM HYDROXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ACROLEIN: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
N-BUTYRALDEHYDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CHLOROSULFONIC ACID: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CRESOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CUMENE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
DIISOPROPYL ETHER: TEMPERTURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
EPICHLOROHYDRINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ETHYLENE DIAMINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
GLYOXAL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ISOPRENE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
MESITYL OXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
2-METHYL-5-ETHYLPYRIDINE: TEMPERATURE/PRESSURE INCREASE IN CLOSED CONTAINER.
OLEUM: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
B-PROPIOLACTONE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
PROPYLENE OXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
PYRIDINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
VINYL ACETATE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
VINYLIDENE CHLORIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.

METAL FERRICYANIDE OR FERROCYANIDE: INCOMPATIBLE.
CHLORINE: INCOMPATIBLE.

DECOMPOSITION:
DECOMPOSES ON EXPOSURE TO AIR OR ORGANIC MATTER, OR WITH HEAT, TO RELEASE HIGHLY TOXIC FUMES OF OXIDES OF NITROGEN, INCLUDING NITRIC OXIDE AND NITROGEN DIOXIDE, AND HYDROGEN NITRATE.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

****
CONDITIONS TO AVOID

NO REPORTS FOUND.

****
SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
COVER WITH SODA ASH. SCOOP UP AND PLACE IN A SUITABLE CONTAINER.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION SYSTEM TO MEET PERMISSIBLE EXPOSURE LIMITS.

RESPIRATOR:
250 MG/M3- CHEMICAL CARTRIDGE RESPIRATOR PROVIDING PROTECTION AGAINST NITRIC ACID.
GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED) PROVIDING PROTECTION AGAINST NITRIC ACID.
SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE, HELMET, OR HOOD.
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
TYPE C SUPPLIED-AIR RESPIRATOR OPERATED IN PRESSURE-DEMAND OR OR OTHER POSITIVE PRESSURE OR CONTINUOUS-FLOW MODE.

ESCAPE- GAS MASK WITH A CANISTER PROVIDING PROTECTION AGAINST NITRIC ACID (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER).
SELF-CONTAINED BREATHING APPARATUS.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

NOTE: DO NOT USE OXIDIZABLE SORBENTS!

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A

FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 11/13/85 REVISION DATE: 11/14/85

-ADDITIONAL INFORMATION-

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Chlorothene VG

Replaced by
Chloro Tase
(R) SM
in book

Chlorothene VG

MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

PRODUCT NAME: CHLOROTHENE VG (R) SOLVENT

Effective Date: 10/04/85 Date Printed: 10/16/85 Product Code: 16822

1. INGREDIENTS:

1,1,1-Trichloroethane	CAS# 000071-55-6	95.1%
1,2-Butylene oxide	CAS# 000106-88-7	
Diethylene ether	CAS# 000123-91-1	
Nitromethane	CAS# 000075-52-5	

The hazard information presented is based on tests conducted on this or similar mixtures. Therefore, pursuant to the OSHA Hazard Communication Standard (see 29 CFR Part 1910,1200 (g) (2) (B)), the information is based on the tested mixture and not individual ingredients.

2. PHYSICAL DATA:

BOILING POINT: 165F (74C)
VAP PRESS: 100 mmHg @ 20C
VAP DENSITY: 4.55
SOL. IN WATER: 0.07g/100g @ 25C
SP. GRAVITY: 1.320 @ 25/25C
APPEARANCE: Colorless liquid.
ODOR: Irritating odor at high concentrations.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: TOC, TCC, COC

FLAMMABLE LIMITS
LFL: 7.5% @ 25C
UFL: 15% @ 25C

EXTINGUISHING MEDIA: Water fog.

FIRE & EXPLOSION HAZARDS: Not available.

(Continued on Page 2)

3. FIRE AND EXPLOSION HAZARD DATA: (CONTINUED)

FIRE-FIGHTING EQUIPMENT: Self-contained, positive pressure, respiratory equipment.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid open flames, welding arcs or other high temperature sources which induce thermal decomposition.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Water - long term contact can deplete stabilizers followed by slow hydrolysis producing corrosive acid. Avoid prolonged contact with, or storage in, aluminum or its alloys. Metallic aluminum and zinc powders should be avoided.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride and very small amounts of phosgene and chlorine.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Small leaks: Mop up, wipe up or soak up immediately. Remove to out-of-doors. Large spills: Evacuate area. Contain liquid; transfer to closed metal containers. Keep out of water supplies.

DISPOSAL METHOD: When disposing of the unused contents, the preferred options are to send to licensed reclaimer, permitted incinerators, or to evaporate very small quantities in compliance with local, state, and federal regulations including Subtitle C of the Resource Conservation and Recovery Act. Dumping into sewers, on the ground, or into any body of water is strongly discouraged, and may be illegal. Consult The Dow Chemical Company for further information.

(Continued on Page 3)

6. HEALTH HAZARD DATA:

EYE: May cause pain. May cause slight transient (temporary) irritation with slight transient corneal injury. Vapors may irritate eyes.

SKIN CONTACT: Prolonged or repeated exposure may cause skin irritation. Repeated contact may cause drying or flaking of skin.

SKIN ABSORPTION: A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The LD50 for rabbits is about 15,000 mg/kg.

INGESTION: Single dose oral toxicity is low. The LD50 for rats is >10,000 mg/kg. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

INHALATION: Minimal anesthetic or narcotic effects may be seen in the range of 500-1000 ppm trichloroethane. Progressively higher levels over 1000 ppm may cause dizziness, drunkenness; concentrations as low as 10,000 ppm can cause unconsciousness and death. In confined or poorly ventilated areas, vapors which readily accumulate can cause unconsciousness and death. These high levels may also cause cardiac arrhythmias (irregular heartbeats).

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause any significant adverse effects. Did not cause cancer in long-term animal studies. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. In animal studies, has been shown not to interfere with reproduction. Results of in vitro ("test tube") mutagenicity tests have been inconclusive. Results of mutagenicity tests in animals have been negative.

(Continued on Page 4)

7. FIRST AID:

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower. Remove contaminated clothing and wash before reuse.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Call a physician.

NOTE TO PHYSICIAN: Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Exposure may increase "myocardial irritability." Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): 1,1,1-TRICHLOROETHANE - OSHA standard is 350 ppm and current ACGIH TLV is 350 ppm (450 ppm STEL).

ACGIH TLV is 25 ppm skin for diethylene ether; the STEL is 100 ppm. OSHA PEL is 100 ppm skin for diethylene ether. Dow Industrial Hygiene Guide for 1,2-butylene oxide is 40 ppm (excursion 100 ppm). ACGIH TLV for nitromethane is 100 ppm with a STEL of 150 ppm.

VENTILATION: Control airborne concentrations below the exposure guideline. Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Lethal concentrations may exist in areas with poor ventilation.

(Continued on Page 5)

8. HANDLING PRECAUTIONS: (CONTINUED)

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved positive pressure self-contained breathing apparatus.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, or full body suit will depend on operation.

EYE PROTECTION: Use safety glasses. Where contact with liquid is likely, chemical goggles are recommended because eye contact with this material may cause pain, even though it is unlikely to cause injury.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Handle with reasonable care. Avoid breathing vapors. Store in a cool dry place. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits, degreasers, storage tanks, and other confined areas. Do not enter these areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance.

1,1,1-Trichloroethane products should not be packaged in aluminum aerosol cans or with finely divided aluminum or its alloys in an aerosol can.

Aluminum is not an acceptable material of construction for pumps, mixers, fittings, storage tanks for 1,1,1-trichloroethane

(Continued on Page 6)

9. ADDITIONAL INFORMATION: (CONTINUED)

products or formulations. Metallic aluminum and zinc powders should be avoided. For additional information on toxicity, handling precautions, and first aid, refer to chlorinated solvents literature form no. 100-5792.

MSDS STATUS: Revised sections 1, 5, 6, 8, and 9.
MSDS STATUS: Revised sections 1, 5, 6, 8, and 9.

DOW CHEMICAL U.S.A.

WILLARD H. DOW CENTER
MIDLAND, MICHIGAN 48674

October 21, 1985

CERRO COPPER PRODUCTS CO INC 0054478

2000 BRASS MILL RD
SAUGET IL 62201

Gentlemen:

Enclosed are Material Safety Data Sheets (MSDS) which provide information on products which you have purchased from us in the recent past. Since you may redirect the products to more than one place within your location, please make sure this information is available to all persons handling and/or using the product.

The distribution of these sheets is part of a continuing program of providing information and updating our customers. The regulations promulgated by OSHA for Hazard Communication, 29 CFR 1910.1200, as well as several state and local laws and regulations, have been considered in preparing these Material Safety Data Sheets.

Thank you for your help.

A.T. Talcott

A.T. Talcott
Manager, Product Safety Compliance
Quality Assurance Department

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Enclosures

Chlorothene VG

MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

PRODUCT NAME: CHLOROTHENE VG (R) SOLVENT

Effective Date: 10/04/85 Date Printed: 10/07/85 Product Code: 16822

1. INGREDIENTS:

1,1,1-Trichloroethane	CAS# 000071-55-6	95.1%
1,2-Butylene oxide	CAS# 000106-88-7	
Diethylene ether	CAS# 000123-91-1	
Nitromethane	CAS# 000075-52-5	

The hazard information presented is based on tests conducted on this or similar mixtures. Therefore, pursuant to the OSHA Hazard Communication Standard (see 29 CFR Part 1910.1200 (g)(2)(B)), the information is based on the tested mixture and not individual ingredients.

2. PHYSICAL DATA:

BOILING POINT: 165F (74C)
VAP PRESS: 100 mmHg @ 20C
VAP DENSITY: 4.55
SOL. IN WATER: 0.07g/100g @ 25C
SP. GRAVITY: 1.320 @ 25/25C
APPEARANCE: Colorless liquid.
ODOR: Irritating odor at high concentrations.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: TOC, TCC, COC

FLAMMABLE LIMITS
LFL: 7.5% @ 25C
UFL: 15% @ 25C

EXTINGUISHING MEDIA: Water fog.

FIRE & EXPLOSION HAZARDS: Not available.

FIRE-FIGHTING EQUIPMENT: Self-contained, positive pressure, respiratory equipment.

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(R) Indicates a trademark of The Dow Chemical Company

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid open flames, welding arcs or other high temperature sources which induce thermal decomposition.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Water - long term contact can deplete stabilizers followed by slow hydrolysis producing corrosive acid. Avoid prolonged contact with, or storage in, aluminum or its alloys. Metallic aluminum and zinc powders should be avoided.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride and very small amounts of phosgene and chlorine.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Small leaks: Mop up, wipe up or soak up immediately. Remove to out-of-doors. Large spills: Evacuate area. Contain liquid; transfer to closed metal containers. Keep out of water supplies.

DISPOSAL METHOD: When disposing of the unused contents, the preferred options are to send to licensed reclaimer, permitted incinerators, or to evaporate very small quantities in compliance with local, state, and federal regulations including Subtitle C of the Resource Conservation and Recovery Act. Dumping into sewers, on the ground, or into any body of water is strongly discouraged, and may be illegal. Consult The Dow Chemical Company for further information.

6. HEALTH HAZARD DATA:

EYE: May cause pain. May cause slight transient (temporary) irritation with slight transient corneal injury. Vapors may irritate eyes.

SKIN CONTACT: Prolonged or repeated exposure may cause skin

(Continued on Page 3)

6. HEALTH HAZARD DATA: (Continued)

irritation. Repeated contact may cause drying or flaking of skin.

SKIN ABSORPTION: A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The LD50 for rabbits is about 15,000 mg/kg.

INGESTION: Single dose oral toxicity is low. The LD50 for rats is >10,000 mg/kg. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

INHALATION: Minimal anesthetic or narcotic effects may be seen in the range of 500-1000 ppm trichloroethane. Progressively higher levels over 1000 ppm may cause dizziness, drunkenness; concentrations as low as 10,000 ppm can cause unconsciousness and death. In confined or poorly ventilated areas, vapors which readily accumulate can cause unconsciousness and death. These high levels may also cause cardiac arrhythmias (irregular heartbeats).

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause any significant adverse effects. Did not cause cancer in long-term animal studies. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. In animal studies, has been shown not to interfere with reproduction. Results of in vitro ("test tube") mutagenicity tests have been inconclusive. Results of mutagenicity tests in animals have been negative.

7. FIRST AID:

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower. Remove contaminated clothing and wash before reuse.

INGESTION: Do not induce vomiting. Call a physician and/or

(Continued on Page 4)

7. FIRST AID: (Continued)

transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Call a physician.

NOTE TO PHYSICIAN: Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Exposure may increase 'myocardial irritability.' Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): 1,1,1-TRICHLOROETHANE - OSHA standard is 350 ppm and current ACGIH TLV is 350 ppm (450 ppm STEL).

ACGIH TLV is 25 ppm skin for diethylene ether; the STEL is 100 ppm. OSHA PEL is 100 ppm skin for diethylene ether. Dow Industrial Hygiene Guide for 1,2-butylene oxide is 40 ppm (excursion 100 ppm). ACGIH TLV for nitromethane is 100 ppm with a STEL of 150 ppm.

VENTILATION: Control airborne concentrations below the exposure guideline. Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Lethal concentrations may exist in areas with poor ventilation.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved

(ntinued on Page 5)

8. HANDLING PRECAUTIONS: (Continued)

positive pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved positive pressure self-contained breathing apparatus.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, or full body suit will depend on operation.

EYE PROTECTION: Use safety glasses. Where contact with liquid is likely, chemical goggles are recommended because eye contact with this material may cause pain, even though it is unlikely to cause injury.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Handle with reasonable care. Avoid breathing vapors. Store in a cool dry place. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits, degreasers, storage tanks, and other confined areas. Do not enter these areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance.

1,1,1-Trichloroethane products should not be packaged in aluminum aerosol cans or with finely divided aluminum or its alloys in an aerosol can.

Aluminum is not an acceptable material of construction for pumps, mixers, fittings, storage tanks for 1,1,1-trichloroethane products or formulations. Metallic aluminum and zinc powders should be avoided. For additional information on toxicity, handling precautions; and first aid, refer to chlorinated solvents literature form no. 100-5792.

MSDS STATUS: Revised sections 1, 5, 6, 8, and 9.

(ontinued on Page 6)

9. ADDITIONAL INFORMATION: (Continued)

MSDS STATUS: Revised sections 1, 5, 6, 8, and 9.

Chlorothene

MATERIAL SAFETY DATA SHEET

Dow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

PRODUCT NAME: CHLOROTHENE VG (R) SOLVENT

Effective Date: 10/04/85 Date Printed: 10/16/85 Product Code: 16822

1. INGREDIENTS:

1,1,1-Trichloroethane	CAS# 000071-55-6	95.1%
1,2-Butylene oxide	CAS# 000106-88-7	
Diethylene ether	CAS# 000123-91-1	
Nitromethane	CAS# 000075-52-5	

The hazard information presented is based on tests conducted on this or similar mixtures. Therefore, pursuant to the OSHA Hazard Communication Standard (see 29 CFR Part 1910,1200 (g)(2)(B)), the information is based on the tested mixture and not individual ingredients.

2. PHYSICAL DATA:

BOILING POINT: 165F (74C)
VAP PRESS: 100 mmHg @ 20C
VAP DENSITY: 4.55
SOL. IN WATER: 0.07g/100g @ 25C
SP. GRAVITY: 1.320 @ 25/25C
APPEARANCE: Colorless liquid.
ODOR: Irritating odor at high concentrations.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: TOC, TCC, COC

FLAMMABLE LIMITS
LFL: 7.5% @ 25C
UFL: 15% @ 25C

EXTINGUISHING MEDIA: Water fog.

FIRE & EXPLOSION HAZARDS: Not available.

(Continued on Page 2)

3. FIRE AND EXPLOSION HAZARD DATA: (CONTINUED)

FIRE-FIGHTING EQUIPMENT: Self-contained, positive pressure, respiratory equipment.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid open flames, welding arcs or other high temperature sources which induce thermal decomposition.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Water - long term contact can deplete stabilizers followed by slow hydrolysis producing corrosive acid. Avoid prolonged contact with, or storage in, aluminum or its alloys. Metallic aluminum and zinc powders should be avoided.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride and very small amounts of phosgene and chlorine.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Small leaks: Mop up, wipe up or soak up immediately. Remove to out-of-doors. Large spills: Evacuate area. Contain liquid; transfer to closed metal containers. Keep out of water supplies.

DISPOSAL METHOD: When disposing of the unused contents, the preferred options are to send to licensed reclaimer, permitted incinerators, or to evaporate very small quantities in compliance with local, state, and federal regulations including Subtitle C of the Resource Conservation and Recovery Act. Dumping into sewers, on the ground, or into any body of water is strongly discouraged, and may be illegal. Consult The Dow Chemical Company for further information.

(Continued on Page 3)

6. HEALTH HAZARD DATA:

EYE: May cause pain. May cause slight transient (temporary) irritation with slight transient corneal injury. Vapors may irritate eyes.

SKIN CONTACT: Prolonged or repeated exposure may cause skin irritation. Repeated contact may cause drying or flaking of skin.

SKIN ABSORPTION: A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The LD50 for rabbits is about 15,000 mg/kg.

INGESTION: Single dose oral toxicity is low. The LD50 for rats is >10,000 mg/kg. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

INHALATION: Minimal anesthetic or narcotic effects may be seen in the range of 500-1000 ppm trichloroethane. Progressively higher levels over 1000 ppm may cause dizziness, drunkenness; concentrations as low as 10,000 ppm can cause unconsciousness and death. In confined or poorly ventilated areas, vapors which readily accumulate can cause unconsciousness and death. These high levels may also cause cardiac arrhythmias (irregular heartbeats).

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause any significant adverse effects. Did not cause cancer in long-term animal studies. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. In animal studies, has been shown not to interfere with reproduction. Results of in vitro ("test tube") mutagenicity tests have been inconclusive. Results of mutagenicity tests in animals have been negative.

(Continued on Page 4)

7. FIRST AID:

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower. Remove contaminated clothing and wash before reuse.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Call a physician.

NOTE TO PHYSICIAN: Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Exposure may increase "myocardial irritability." Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): 1,1,1-TRICHLOROETHANE - OSHA standard is 350 ppm and current ACGIH TLV is 350 ppm (450 ppm STEL).

ACGIH TLV is 25 ppm skin for diethylene ether; the STEL is 100 ppm. OSHA PEL is 100 ppm skin for diethylene ether. Dow Industrial Hygiene Guide for 1,2-butylene oxide is 40 ppm (excursion 100 ppm). ACGIH TLV for nitromethane is 100 ppm with a STEL of 150 ppm.

VENTILATION: Control airborne concentrations below the exposure guideline. Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Lethal concentrations may exist in areas with poor ventilation.

(Continued on Page 5)

8. HANDLING PRECAUTIONS: (CONTINUED)

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved positive pressure self-contained breathing apparatus.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, or full body suit will depend on operation.

EYE PROTECTION: Use safety glasses. Where contact with liquid is likely, chemical goggles are recommended because eye contact with this material may cause pain, even though it is unlikely to cause injury.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Handle with reasonable care. Avoid breathing vapors. Store in a cool dry place. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits, degreasers, storage tanks, and other confined areas. Do not enter these areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance.

1,1,1-Trichloroethane products should not be packaged in aluminum aerosol cans or with finely divided aluminum or its alloys in an aerosol can.

Aluminum is not an acceptable material of construction for pumps, mixers, fittings, storage tanks for 1,1,1-trichloroethane

(Continued on Page 6)

9. ADDITIONAL INFORMATION: (CONTINUED)

products or formulations. Metallic aluminum and zinc powders should be avoided. For additional information on toxicity, handling precautions, and first aid, refer to chlorinated solvents literature form no. 100-5792.

MSDS STATUS: Revised sections 1, 5, 6, 8, and 9.
MSDS STATUS: Revised sections 1, 5, 6, 8, and 9.

DOW CHEMICAL U.S.A.

WILLARD H. DOW CENTER
MIDLAND, MICHIGAN 48674

October 21, 1985

CERRO COPPER & BRASS CO 2238988

SAUGET IL 62201

Gentlemen:

Enclosed are Material Safety Data Sheets (MSDS) which provide information on products which you have purchased from us in the recent past. Since you may redirect the products to more than one place within your location, please make sure this information is available to all persons handling and/or using the product.

The distribution of these sheets is part of a continuing program of providing information and updating our customers. The regulations promulgated by OSHA for Hazard Communication, 29 CFR 1910.1200, as well as several state and local laws and regulations, have been considered in preparing these Material Safety Data Sheets.

Thank you for your help.

A.T. Talcott

A.T. Talcott
Manager, Product Safety Compliance
Quality Assurance Department

bb

Enclosures

THE DOW CHEMICAL COMPANY QUALITY ASSURANCE 16896
SALES SPECIFICATION

PRODUCT CODE: 16896 EFFECTIVE: 24 JAN 83 SUPERSEDES: 31 AUG 81

NAME: CHLOROTHENE (R) SM SOLVENT

1,1,1-TRICHLOROETHANE SOLVENT
DESC: COLORLESS LIQUID, FREE OF SUSPENDED MATTER AND SEDIMENT
APPL GOVT/IND SPDS: MIL-STD-810A
: MIL-STD-767C (SH)
: MIL-T-81533A
: FED SPEC O-T-620C
: CANADIAN STD. 31-GP-213A
: NASA-MSFC-PROC-166C
: BRITISH DEFENSE STD 68-21/1 TYPE 1
: MIL B-197F
: A-A-1544
: ASME BOILER & PV CODE, SEC. V, ART. 6

TEST ITEM	UNIT	LIMITS	TEST METHODS
APPEARANCE		ESSENTIALLY FREE OF SEDIMENT AND SUSPENDED MATTER	VISUAL
WATER CONTENT, MAX.	PPM	100	16822A
COLOR, PT-CO, MAX.		5	16822A;ASTM D2129
NON-VOLATILE RESIDUE, MAX.	PPM	7.5	16822A
ACID ACCEPTANCE (AS NAOH), MIN.	%W	0.22	16822A
---PURITY---			
1,1,1-TRICHLOROETHANE, MIN.	%V	94.5	16822A;MIL-T-81533A
1,1,1-TRICHLOROETHANE, MIN.	%V	99.5	16822A;MIL-T-81533A
INDIVIDUAL HALOGENATED IMPURITIES, MAX.	%V	0.25	16822A;MIL-T-81533A
TOTAL HALOGENATED IMPURITIES, MAX.	%V	0.50	16822A;MIL-T-81533A
---TYPICAL PROPERTIES---			
FREE HALOGENS	PPM	NONE	16822A;MIL-T-81533A
ACIDITY (AS HCL) MAX.	PPM	10	16822A
ACIDITY AFTER ACCELERATED OXIDATION		PASSES MIL-T-81533A (NOTE 2)	16822A;MIL-T-81533A
METALS CORROSION		PASSES	16822A;MIL-T-81533A

(R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

PRODUCT CODE: 16656 (CONTINUED)
NAME: CHLOROTHENE (R) SM SOLVENT

TEST ITEM	: UNIT	: LIMITS	: TEST METHODS
-----TEST ITEMS----- (CONTINUED)			
		MIL-T-81533A (NOTE 2)	
RELATIVE DENSITY (SPECIFIC GRAVITY @ 25/25 C)		1.317-1.324 (NOTE 1)	16622A;ASTM D2111
DISTILLATION RANGE MM, IBP-DP	C	72-88 (NOTE 1)	16622A;ASTM D1078

PI: 2500544 SAMPLE
PI: 2500171 55 GAL DRUM
PI: 2500167 BULK

SALES NOTE:
REVISED 24 JAN 83 TO ADD APPEARANCE.

(1) IT HAS BEEN DETERMINED THAT MATERIAL MEETING THE LIMITS IMPOSED UNDER "TEST ITEMS" AND "PURITY" WILL FALL WITHIN THE LIMITS INDICATED. THESE ARE NOT ROUTINE TEST ITEMS.
(2) IT HAS BEEN DETERMINED THAT MATERIAL MEETING THE "ACID ACCEPTANCE" MINIMUM REQUIREMENT WILL PASS THESE TESTS. THESE ARE NOT ROUTINE TEST ITEMS.
(3) THIS MATERIAL IS A SPECIALLY FILTERED PRODUCT.

READ PRECAUTIONARY INFORMATION AND MATERIAL SAFETY DATA SHEETS. THIS PRODUCT IS SHIPPED IN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS REGARDING CLASSIFICATION, PACKAGING, SHIPPING, AND LABELING.

(R) INDICATES A TRADEMARK OF THE DOW CHEMICAL COMPANY

LAST PAGE

MATERIAL SAFETY DATA SHEET

ow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 10/04/85 Date Printed: 10/07/85 Product Code: 16896

1. INGREDIENTS:

1,1,1-Trichloroethane	CAS# 000071-55-6	95.5%
1,2-Butylene oxide	CAS# 000106-88-7	
Diethylene Ether	CAS# 000123-91-1	
Nitromethane	CAS# 000075-52-5	

The hazard information presented is based on tests conducted on this or similar mixtures. Therefore, pursuant to the OSHA Hazard Communication Standard (see 29 CFR Part 1910.1200 (g)(2)(B)), the information is based on the tested mixture and not individual ingredients.

2. PHYSICAL DATA:

BOILING POINT: 165F (74C)
VAP PRESS: 100 mmHg @ 20C
VAP DENSITY: 4.55
SOL. IN WATER: 0.07 g/100g @ 25C
SP. GRAVITY: 1.321 @ 25/25C
APPEARANCE: Colorless liquid.
ODOR: Irritating odor at high concentrations.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: TOC, TCC, COC

FLAMMABLE LIMITS
LFL: 7.5% @ 25C
UFL: 15% @ 25C

EXTINGUISHING MEDIA: Water fog.

FIRE & EXPLOSION HAZARDS: Not available.

FIRE-FIGHTING EQUIPMENT: Self-contained, positive pressure respiratory equipment.

(Continued on Page 2)

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid open flames, welding arcs or other high temperature sources which induce thermal decomposition.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Water - long term contact can deplete stabilizers followed by slow hydrolysis producing corrosive acid. Avoid prolonged contact with, or storage in, aluminum or its alloys. Metallic aluminum and zinc powders should be avoided.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride and very small amounts of phosgene and chlorine.

HAZARDOUS POLYMERIZATION: Will not occur.

ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Small leaks: Mop up, wipe up, or soak up immediately. Remove to out-of-doors. Large spills: Evacuate area. Contain liquid; transfer to closed metal containers. Keep out of water supplies.

DISPOSAL METHOD: When disposing of the unused contents, the preferred options are to send to licensed reclaimer, permitted incinerators, or to evaporate small quantities in compliance with local, state, and federal regulations including Subtitle C of the Resource Conservation and Recovery Act. Dumping into sewers, on the ground, or into any body of water is strongly discouraged, and may be illegal. Consult The Dow Chemical Company for further information.

6. HEALTH HAZARD DATA:

EYE: May cause pain. May cause slight transient (temporary) irritation with slight transient corneal injury. Vapors may irritate eyes.

SKIN CONTACT: Prolonged or repeated exposure may cause skin

(Continued on Page 3)

6. HEALTH HAZARD DATA: (Continued)

irritation. Repeated contact may cause drying or flaking of skin.

SKIN ABSORPTION: A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The LD50 for rabbits is about 15,000 mg/kg.

INGESTION: Single dose oral toxicity is low. The LD50 for rats is >10,000 mg/kg. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

INHALATION: Minimal anesthetic or narcotic effects may be seen in the range of 500-1000 ppm trichloroethane. Progressively higher levels over 1000 ppm may cause dizziness, drunkenness; concentrations as low as 10,000 ppm can cause unconsciousness and death. In confined or poorly ventilated areas, vapors which readily accumulate can cause unconsciousness and death. These high levels may also cause cardiac arrhythmias (irregular heartbeats).

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause any significant adverse effects. Similar formulations did not cause cancer in long-term animal studies. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. In animal studies, has been shown not to interfere with reproduction. Results of in vitro ('test tube') mutagenicity tests have been inconclusive. Results of mutagenicity tests in animals have been negative.

7. FIRST AID:

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower. Remove contaminated clothing and wash before reuse.

INGESTION: Do not induce vomiting. Call a physician and/or

(Continued on Page 4)

7. FIRST AID: (Continued)

transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Call a physician.

NOTE TO PHYSICIAN: Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Exposure may increase "myocardial irritability." Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): 1,1,1-Trichloroethane - OSHA standard is 350 ppm and current ACGIH TLV is 350 ppm (450 ppm STEL).

ACGIH TLV is 25 ppm skin for diethylene ether; the STEL is 100 ppm. OSHA PEL is 100 ppm skin for diethylene ether. Dow Industrial Hygiene Guide for 1,2-butylene oxide is 40 ppm (excursion 100 ppm). ACGIH TLV for nitromethane is 100 ppm with a STEL of 150 ppm.

VENTILATION: Control airborne concentrations below the exposure guideline. Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Lethal concentrations may exist in areas with poor ventilation.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved

(Continued on Page 5)

8. HANDLING PRECAUTIONS: (Continued)

positive pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved positive pressure self-contained breathing apparatus.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, or full body suit will depend on operation.

EYE PROTECTION: Use safety glasses. Where contact with liquid is likely, chemical goggles are recommended because eye contact with this material may cause pain, even though it is unlikely to cause injury.

ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Handle with reasonable care. Avoid breathing vapors. Store in a cool dry place. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits, degreasers, storage tanks, and other confined areas. Do not enter areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance.

1,1,1-Trichloroethane products should not be packaged in aluminum aerosol cans or with finely divided aluminum or its alloys in an aerosol can.

Aluminum is not an acceptable material of construction for pumps, mixers, fittings, storage tanks for 1,1,1-trichloroethane products or formulations. Metallic aluminum and zinc powders should be avoided. For additional information on toxicity, handling precautions, and first aid, refer to chlorinated solvents literature form no. 100-5792.

MSDS STATUS: Revised sections 1, 5, 6, 8, and 9.

(Continued on Page 6)

(R) Indicates a trademark of The Dow Chemical Company
The Information Herein Is Given In Good Faith, But No Warranty, Expressed Or Implied, Is Made. Consult The Dow Chemical Company For Further Information.

CHLOROTHENE
(R) SM SOLVENT

VOID

MATERIAL SAFETY DATA SHEET

ow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

MSD: 001111 Page: 1

REPLACES CHLOROTHENE (R) VG

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 10/04/85 Date Printed: 10/07/85 Product Code: 16896

1. INGREDIENTS:

1,1,1-Trichloroethane	CAS# 000071-55-6	95.5%
1,2-Butylene oxide	CAS# 000106-88-7	
Diethylene Ether	CAS# 000123-91-1	
Nitromethane	CAS# 000075-52-5	

The hazard information presented is based on tests conducted on this or similar mixtures. Therefore, pursuant to the OSHA Hazard Communication Standard (see 29 CFR Part 1910.1200 (g)(2)(B)), the information is based on the tested mixture and not individual ingredients.

2. PHYSICAL DATA:

BOILING POINT: 165F (74C)
VAP PRESS: 100 mmHg @ 20C
VAP DENSITY: 4.55
SOL. IN WATER: 0.07 g/100g @ 25C
SP. GRAVITY: 1.321 @ 25/25C
APPEARANCE: Colorless liquid.
ODOR: Irritating odor at high concentrations.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: None
METHOD USED: TOC, TCC, COC

FLAMMABLE LIMITS
LFL: 7.5% @ 25C
UFL: 15% @ 25C

EXTINGUISHING MEDIA: Water fog.

FIRE & EXPLOSION HAZARDS: Not available.

FIRE-FIGHTING EQUIPMENT: Self-contained, positive pressure respiratory equipment.

ontinued on Page 2)

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid open flames, welding arcs or other high temperature sources which induce thermal decomposition.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Water - long term contact can deplete stabilizers followed by slow hydrolysis producing corrosive acid. Avoid prolonged contact with, or storage in, aluminum or its alloys. Metallic aluminum and zinc powders should be avoided.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride and very small amounts of phosgene and chlorine.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Small leaks: Mop up, wipe up, or soak up immediately. Remove to out-of-doors. Large spills: Evacuate area. Contain liquid; transfer to closed metal containers. Keep out of water supplies.

DISPOSAL METHOD: When disposing of the unused contents, the preferred options are to send to licensed reclaimer, permitted incinerators, or to evaporate small quantities in compliance with local, state, and federal regulations including Subtitle C of the Resource Conservation and Recovery Act. Dumping into sewers, on the ground, or into any body of water is strongly discouraged, and may be illegal. Consult The Dow Chemical Company for further information.

6. HEALTH HAZARD DATA:

EYE: May cause pain. May cause slight transient (temporary) irritation with slight transient corneal injury. Vapors may irritate eyes.

SKIN CONTACT: Prolonged or repeated exposure may cause skin

(Continued on Page 3)

6. HEALTH HAZARD DATA: (Continued)

irritation. Repeated contact may cause drying or flaking of skin.

SKIN ABSORPTION: A single prolonged skin exposure is not likely to result in absorption of harmful amounts. The LD50 for rabbits is about 15,000 mg/kg.

INGESTION: Single dose oral toxicity is low. The LD50 for rats is >10,000 mg/kg. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

INHALATION: Minimal anesthetic or narcotic effects may be seen in the range of 500-1000 ppm trichloroethane. Progressively higher levels over 1000 ppm may cause dizziness, drunkenness; concentrations as low as 10,000 ppm can cause unconsciousness and death. In confined or poorly ventilated areas, vapors which readily accumulate can cause unconsciousness and death. These high levels may also cause cardiac arrhythmias (irregular heartbeats).

SYSTEMIC & OTHER EFFECTS: Based on available data, repeated exposures are not anticipated to cause any significant adverse effects. Similar formulations did not cause cancer in long-term animal studies. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. In animal studies, has been shown not to interfere with reproduction. Results of in vitro ("test tube") mutagenicity tests have been inconclusive. Results of mutagenicity tests in animals have been negative.

7. FIRST AID:

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower. Remove contaminated clothing and wash before reuse.

INGESTION: Do not induce vomiting. Call a physician and/or

ntinued on Page 4)

7. FIRST AID: (Continued)

transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Call a physician.

NOTE TO PHYSICIAN: Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Exposure may increase "myocardial irritability." Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): 1,1,1-Trichloroethane - OSHA standard is 350 ppm and current ACGIH TLV is 350 ppm (450 ppm STEL).

ACGIH TLV is 25 ppm skin for diethylene ether; the STEL is 100 ppm. OSHA PEL is 100 ppm skin for diethylene ether. Dow Industrial Hygiene Guide for 1,2-butylene oxide is 40 ppm (excursion 100 ppm). ACGIH TLV for nitromethane is 100 ppm with a STEL of 150 ppm.

VENTILATION: Control airborne concentrations below the exposure guideline. Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Lethal concentrations may exist in areas with poor ventilation.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved

ontinued on Page 5)

8. HANDLING PRECAUTIONS: (Continued)

positive pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved positive pressure self-contained breathing apparatus.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, or full body suit will depend on operation.

EYE PROTECTION: Use safety glasses. Where contact with liquid is likely, chemical goggles are recommended because eye contact with this material may cause pain, even though it is unlikely to cause injury.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Handle with reasonable care. Avoid breathing vapors. Store in a cool dry place. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits, degreasers, storage tanks, and other confined areas. Do not enter areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance.

1,1,1-Trichloroethane products should not be packaged in aluminum aerosol cans or with finely divided aluminum or its alloys in an aerosol can.

Aluminum is not an acceptable material of construction for pumps, mixers, fittings, storage tanks for 1,1,1-trichloroethane products or formulations. Metallic aluminum and zinc powders should be avoided. For additional information on toxicity, handling precautions, and first aid, refer to chlorinated solvents literature form no. 100-5792.

MSDS STATUS: Revised sections 1, 5, 6, 8, and 9.

(Continued on Page 6)

Dow Chemical U.S.A. Midland, MI 48674 Emergency Phone: 517-636-4400

PRODUCT NAME: CHLOROTHENE (R) SM SOLVENT

Effective Date: 10/04/85 Date Printed: 10/07/85 Product Code: 16896

CHLOROTHENE VG (1)

M A T E R I A L S A F E T Y D A T A S H E E T PAGE: 1

DOW CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

EFFECTIVE DATE: 23 MAY 83 DATE PRINTED: 9 JUL 84 PRODUCT CODE: 15822

PRODUCT NAME: CHLOROTHENE VG (R) SOLVENT MSD: 0110

INGREDIENTS (TYPICAL VALUES-NOT SPECIFICATIONS)	%
1,1,1-TRICHLOROETHANE (NOMINAL)	96.4

SECTION 1 PHYSICAL DATA

BOILING POINT: 165F (74C)
VAP PRESS: 100 MMHG @ 20C
VAP DENSITY (AIR=1): 4.55
SOL. IN WATER: 0.07G/100G @ 25C
SP. GRAVITY: 1.320 @ 25/25C
% VOLATILE BY VOL: 100 (ESSEN.)

APPEARANCE AND ODOR: COLORLESS LIQUID, IRRITATING ODOR AT HIGH CONCENTRATIONS.

SECTION 2 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: NONE
METHOD USED: TOC, TCC, COC
FLAMMABLE LIMITS
LFL: 7.5% @ 25C UFL: 15% @ 25C

EXTINGUISHING MEDIA: WATER FOG.

SPECIAL FIRE FIGHTING EQUIPMENT AND HAZARDS: SELF-CONTAINED, POSITIVE PRESSURE, RESPIRATORY EQUIPMENT.

SECTION 3 REACTIVITY DATA

STABILITY: AVOID OPEN FLAMES, WELDING ARCS OR OTHER HIGH TEMPERATURE SOURCES WHICH INDUCE THERMAL DECOMPOSITION.

INCOMPATIBILITY: WATER - LONG TERM CONTACT CAN DEPLETE STABILIZERS FOLLOWED BY SLOW HYDROLYSIS PRODUCING CORROSIVE ACID. AVOID PROLONGED CONTACT WITH, OR STORAGE IN, ALUMINUM OR ITS ALLOYS. METALLIC ALUMINUM AND ZINC POWDERS SHOULD BE AVOIDED.

HAZARDOUS DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE AND VERY SMALL AMOUNTS OF PHOSGENE AND CHLORINE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

SECTION 4 SPILL, LEAK, AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS: SMALL LEAKS: MOP UP, WIPE UP OR SOAK UP IMMEDIATELY. REMOVE TO OUT-OF-DOORS.
LARGE SPILLS: EVACUATE AREA. CONTAIN LIQUID; TRANSFER TO CLOSED METAL

(CONTINUED ON PAGE 2)

DOW CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

EFFECTIVE DATE: 23 MAY 83 DATE PRINTED: 9 JUL 84 PRODUCT CODE: 16822
RODUCT (CONT'D): CHLOROTHENE VG (R) SOLVENT MSD: 0110

SECTION 4 SPILL, LEAK, AND DISPOSAL PROCEDURES (CONTINUED)

ACTION TO TAKE FOR SPILLS: (CONTINUED)
CONTAINERS. KEEP OUT OF WATER SUPPLIES.

DISPOSAL METHOD: (IN ORDER OF PREFERENCE) SEND SOLVENT TO LICENSED RECLAIMER, INCINERATE, EVAPORATE VERY SMALL QUANTITIES, OR SEND TO APPROVED LANDFILL BURIAL IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS. DUMPING INTO SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER IS STRONGLY DISCOURAGED, AND MAY BE ILLEGAL.

SECTION 5 HEALTH HAZARD DATA

EYE: MAY CAUSE PAIN. MAY CAUSE SLIGHT TRANSIENT IRRITATION WITH SLIGHT TRANSIENT CORNEAL INJURY. VAPORS MAY IRRITATE EYES.

SKIN CONTACT: PROLONGED OR REPEATED EXPOSURE MAY CAUSE SKIN IRRITATION. REPEATED CONTACT MAY CAUSE DEFATTING OF SKIN.

SKIN ABSORPTION: A SINGLE PROLONGED SKIN EXPOSURE IS NOT LIKELY TO RESULT IN ABSORPTION OF HARMFUL AMOUNTS. THE LD50 FOR RABBITS IS ABOUT 15,000 MG/KG.

INGESTION: SINGLE DOSE ORAL TOXICITY IS LOW. THE LD50 FOR RATS IS >10,000 MG/KG. IF ASPIRATED, MAY CAUSE RAPID ABSORPTION THROUGH THE LUNGS WHICH MAY RESULT IN SYSTEMIC EFFECTS.

INHALATION: MINIMAL ANESTHETIC OR NARCOTIC EFFECTS MAY BE SEEN IN THE RANGE OF 500-1000 PPM TRICHLOROETHANE. PROGRESSIVELY HIGHER LEVELS OVER 1000 PPM MAY CAUSE DIZZINESS, DRUNKENNESS; CONCENTRATIONS IN EXCESS OF 10,000 PPM CAN CAUSE UNCONSCIOUSNESS AND DEATH. IN CONFINED OR POORLY VENTILATED AREAS, VAPORS WHICH READILY ACCUMULATE CAN CAUSE UNCONSCIOUSNESS AND DEATH. THESE HIGH LEVELS MAY ALSO CAUSE CARDIAC ARRHYTHMIAS (IRREGULAR HEARTBEATS).

SYSTEMIC & OTHER EFFECTS: ----

SECTION 6 FIRST AID

EYES: IRRIGATE IMMEDIATELY WITH WATER FOR AT LEAST 5 MINUTES.

SKIN: WASH OFF IN FLOWING WATER OR SHOWER. REMOVE CONTAMINATED CLOTHING AND WASH BEFORE REUSE.

INGESTION: DO NOT INDUCE VOMITING. CALL A PHYSICIAN AND/OR TRANSPORT TO EMERGENCY FACILITY IMMEDIATELY.

INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE MOUTH-TO-MOUTH RESUSCITATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. CALL A PHYSICIAN.

NOTE TO PHYSICIAN: BECAUSE RAPID ABSORPTION MAY OCCUR THROUGH LUNGS IF ASPIRATED AND CAUSE SYSTEMIC EFFECTS, THE DECISION OF WHETHER TO INDUCE VOMITING OR NOT SHOULD BE MADE BY AN ATTENDING PHYSICIAN. IF

(CONTINUED ON PAGE 3)

DOW CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

EFFECTIVE DATE: 23 MAY 84 DATE PRINTED: 9 JUL 84 PRODUCT CODE: 16822
RODUCT (CONT'D): CHLOROTHENE VG (R) SOLVENT MSD: 0110

SECTION 6 FIRST AID (CONTINUED)

NOTE TO PHYSICIAN: (CONTINUED)
LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGEAL CONTROL. DANGER FROM LUNG ASPIRATION MUST BE WEIGHED AGAINST TOXICITY WHEN CONSIDERING EMPTYING THE STOMACH. EXPOSURE MAY INCREASE "MYOCARDIAL IRRITABILITY". DO NOT ADMINISTER SYMPATHOMIMETIC DRUGS UNLESS ABSOLUTELY NECESSARY. NO SPECIFIC ANTIDOTE. SUPPORTIVE CARE. TREATMENT BASED ON JUDGMENT OF THE PHYSICIAN IN RESPONSE TO REACTIONS OF THE PATIENT.

SECTION 7 SPECIAL HANDLING INFORMATION

EXPOSURE GUIDELINE(S): 1,1,1-TRICHLOROETHANE - OSHA STANDARD IS 350 PPM AND CURRENT ACGIH TLV IS 350 PPM (450 PPM STEL).

VENTILATION: CONTROL VAPORS TO STANDARD.

RESPIRATORY PROTECTION: APPROVED ORGANIC VAPOR-TYPE RESPIRATOR REQUIRED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. FOR EMERGENCIES, A POSITIVE-PRESSURE BREATHING APPARATUS OR A FULL-FACE RESPIRATOR WITH AN APPROVED ORGANIC VAPOR CANISTER IS RECOMMENDED.

PROTECTIVE CLOTHING: NO SPECIAL PROTECTIVE CLOTHING NEEDED. HOWEVER, FOR FREQUENT OR PROLONGED CONTACT USE GLOVES MADE OF VITON, NEOPRENE OR POLYVINYL ALCOHOL; BOOTS AND APRON DEPENDING UPON THE EXTENT AND SEVERITY OF EXPOSURE LIKELY.

EYE PROTECTION: SAFETY GLASSES. IT IS RECOMMENDED THAT AN EYE-WASH STATION BE AVAILABLE.

SECTION 8 SPECIAL PRECAUTIONS AND ADDITIONAL INFORMATION

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: HANDLE WITH REASONABLE CARE. AVOID BREATHING VAPORS. STORE IN A COOL DRY PLACE. VAPORS OF THIS PRODUCT ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS SUCH AS PITS, DEGREASERS, STORAGE TANKS, AND OTHER CONFINED AREAS. DO NOT ENTER THESE AREAS WHERE VAPORS OF THIS PRODUCT ARE SUSPECTED UNLESS SPECIAL BREATHING APPARATUS IS USED AND AN OBSERVER IS PRESENT FOR ASSISTANCE.

1,1,1-TRICHLOROETHANE PRODUCTS SHOULD NOT BE PACKAGED IN ALUMINUM AEROSOL CANS OR WITH FINELY DIVIDED ALUMINUM OR ITS ALLOYS IN AN AEROSOL CAN.

ALUMINUM IS NOT AN ACCEPTABLE MATERIAL OF CONSTRUCTION FOR PUMPS, MIXERS, FITTINGS, STORAGE TANKS FOR 1,1,1-TRICHLOROETHANE PRODUCTS OR FORMULATIONS. METALLIC ALLUMINUM AND ZINC POWDERS SHOULD BE AVOIDED.

FOR ADDITIONAL INFORMATION ON TOXICITY, HANDLING PRECAUTIONS, AND FIRST AID, REFER TO CHLORINATED SOLVENTS LITERATURE FORM NO. 100-5792.

(CONTINUED ON PAGE 4)

DOW CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

EFFECTIVE DATE: 23 MAY 83 DATE PRINTED: 9 JUL 84 PRODUCT CODE: 16822
PRODUCT (CONT'D): CHLOROTHENE VG (R) SOLVENT MSD: 0110

SECTION 8 SPECIAL PRECAUTIONS AND ADDITIONAL INFORMATION (CONTINUED)

ADDITIONAL INFORMATION: REVISED SECTIONS 1, 2, 3, 4, 5, 6, 7, AND 8.

LAST PAGE

VOID — OLD — CC5050

OMB No. 44-R1...

Occupational Safety and Health Administration

Chlorinated Solvent (23)

MATERIAL SAFETY DATA SHEET

CC 5050

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Waste Research & Reclamation Co., Inc.	(715) 834-9624

ADDRESS (Number, Street, City, State, and ZIP Code)
Route 7 Eau Claire, Wisconsin 54701

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Chlorinated Solvent Blend	CC #5050

CHEMICAL FAMILY	FORMULA
	See below

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
Methylene Chloride &		300	BASE METAL		
Freon 113	10-15	1000	ALLOYS		
111 Trichloroethane	50-60	350	METALLIC COATINGS		
Trichloroethylene	10-15	100	FILLER METAL PLUS COATING OR CORE FLUX		
Perchloroethylene	4-8	200	OTHERS		
Inhibators	6	100			

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	120	SPECIFIC GRAVITY (H_2O=1)	1.325
VAPOR PRESSURE (mm Hg.)	150	PERCENT, VOLATILE BY VOLUME (%)	100
VAPOR DENSITY (AIR=1)	4.5	EVAPORATION RATE (_____ =1)	variable
SOLUBILITY IN WATER			

APPEARANCE AND ODOR

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
do not flash to boiling pt. 120°F			

EXTINGUISHING MEDIA
Carbon dioxide or dry chemical for small fires, ordinary foam for large fires.

SPECIAL FIRE FIGHTING PROCEDURES
none

UNUSUAL FIRE AND EXPLOSION HAZARDS
none

C01365

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
TLV - 270 ppm *

EFFECTS OF OVEREXPOSURE
(1) skin-minor irritation (2) anesthetic effects may occur in the range of 300-1000 ppm. If breathing stops, give artificial resperation, medical help.

EMERGENCY AND FIRST AID PROCEDURES
Inhalation- remove to fresh air, keep warm and quiet until recover.

Skin & Eyes-Flush eyes with plenty of water. For both skin and eyes get medical attn. if irritation or injury develops. Indigestion- treat symptomatically. - No known antidote.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID Open flames, welding arcs-can cause thermal decom-
	STABLE		position producing hydrogen chloride and phosgene.

INCOMPATABILITY *(Materials to avoid)*
Water-slow hydrolysis produces corrosive acid.

HAZARDOUS DECOMPOSITION PRODUCTS
Exposure to high temp or open flam generates hydrogen chloride and small amounts of phosgene & chlorine.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR		

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Small spills-mop, wipe or soak with absorbent material using proper protective equipment. Bury. Large spills-evacuate area, using proper protective equipment, flush spill to ground and let evaporate. Keep out of water supply and away from inhibited build.

WASTE DISPOSAL METHOD
Bury away from water supply or allow solvent to evaporate to atmosphere at a safe distance from inhabited buildings. For reclamation, keep solvent in good drums, seal tight & send to WR&R.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
conc. above 2% use self contained breathing apparatus.

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)* Provide ventillation to control TLV	OTHER

PROTECTIVE GLOVES
no

EYE PROTECTION
safety glasses without side shields.

OTHER PROTECTIVE EQUIPMENT
~~conc. above 2%~~ use self contained breathing apparatus.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
~~H~~ndle with reasonable care! Avoid breathing vapors in concentrations over 200 ppm with a maxium peak of 300 ppm. Store in cool dry place.

OTHER PRECAUTIONS

* By TLV weighted percents.

LABORATORY TEST REPORT
CHLOROHYDROCARBON SOLVENT

Date: 2-4-80

No: _____

WASTE RESEARCH and
RECLAMATION CO., INC.
Route 3 o EAU CLAIRE, WISCONSIN 54701

Solvent: CC #5050

Waste Generated by: _____

Total Amount of Spent Solvent: _____ lb. _____ bbls. _____

Amount of Recyclable Solvent: _____ lb. _____ bbls. _____

Amount of Waste For Disposal _____ lb. _____ bbls. _____

Percent Recovery _____ Percent Waste: _____

TEST RESULTS

Liquid Density at 25° C.: 1.325 ± 0.010

Boiling Point: 40 to 90 °C (___°F)

Moisture Content: _____ ppm

Acid Acceptance (Dow): _____ %

Amount Of Inhibitors: _____

Aluminum Scratch: _____

Recommendation: Flash Point: No flash to boiling point 120°F

COMPOSITION:	Methylene Chloride (w/Freon)	10-15%
	1-1-1 trichloroethane	50-60%
	Trichloroethylene	10-15%
	Perchloroethylene and Toluol	4-8%
	Inhibitors	6%

TLV Combined approx. 270 ppm

Signed: _____

Approved: _____

WASTE RESEARCH and RECLAMATION CO., INC.

CHEMICAL INNOVATION FOR INDUSTRY

CC #5050

CC #5050, Degreaser and general purpose is a special blend of chlorinated solvents with minor amounts of inhibators and additives. It has fast acting and fast drying properties. This blend of solvents possess excellent solvent and penetrating properties, combines with low vapor toxicity and non-flammability. It is an ideal solvent for removing grease, oil, wax and various kinds of paint.

The spent material can be recycled to its virgin specifications at WR&R. Considerable savings can be effected in two ways: Solving the problems of disposal with additional economic savings on the returned solvent blend.

Typical Properties:

Appearance	water white, clear
Specific Gravity	1.320 ± 0010; approx. 11.00/gal.
Flash & Fire Point	none at boiling point
Flammability	non-flammable
Toxicity, TLV	270 ppm MAC 300 ppm
Boiling Point	50° C (initial)
Moisture Content	300 ppm max.

Direction for Use:

CC #5050 dissolves most of the greases, oils and waxes. It is safe to be used for clean up in all of the machining processes. This blend solvent also has excellent penetrating power for various kinds of paints and can be used to remove paints. This blend solvent has been specially inhibated for cleaning parts made of aluminum or zinc or their alloys.

Safety Data:

CC #5050 is non-flammable, however, care should be excercised in avoiding direct contact with an open flame or extremely hot objects. Adequate ventillation should be provided in order to exhaust any vapor from solvent evaporation. Operators should be equipped with rubber gloves, aprons and other protective equipment in accordance with the safety practices.

Packaging:

Fifty-five gallon steel drums, bulk.

United States
Environmental Protection
Agency

Office of Pesticides and
Toxic Substances (TS-799)
Washington DC 20460

September 1984

EPA

Notice to Workers of Potential Risk Nitrosamines in Metalworking Fluids

11-5-84 we do not have Dose

Summary

If you do machining, grinding, or other work that involves metalworking fluids, you may be exposed to nitrosamines. Most of these chemicals cause cancer in laboratory animals. They are suspected of causing cancer in humans. This Advisory suggests ways to reduce your exposure to nitrosamines.

Basis For Concern

Metalworking fluids may contain a variety corrosion inhibitors. These include chemicals called amines and chemicals called nitrites (such as sodium or potassium nitrite). When both amines and nitrites are combined in the same fluid, they may form nitrosamines.

Exposure To Nitrosamines

Everyone is exposed to some nitrosamines, from a variety of sources in every-day life. However, machinists who use metalworking fluids containing both amines and nitrites may be exposed to as much as 100 times more nitrosamines daily than the average person gets from all other sources.

Precautions

Machinists should avoid skin contact with metalworking fluids containing nitrites and amines. You should also avoid breathing mists of such fluids.

You may be able to find out whether there are amines and/or nitrites in metalworking fluids you work with by checking the container labels, or product literature your employer receives from the manufacturer or supplier.

Sometimes chemicals are added to metalworking fluids to extend their useful life. You should not add nitrites for this purpose if amines are present.

Control Measures

Use of metalworking fluids containing both amines and nitrites should be avoided. If use is absolutely unavoidable, shields and face guards should be installed to reduce human contact with mists or splashed fluid. Shops should have effective forced ventilation to minimize the inhalation of mists. Clothing permeated with metalworking fluids should be laundered as often as possible. Impervious aprons should be worn to reduce dermal contact. Rubber gloves may provide limited protection, but they should be replaced often since experimental data indicate that nitrosamines penetrate many kinds of glove material.

C01366

Notification Requirements

There are various Federal notification requirements for nitrosamine releases. Such releases could potentially adversely affect exposed individuals or adversely affect the environment. If you are aware of releases into the environment that may need to be reported, please contact the National Response Center (NRC) [call toll-free at 800-424-8802, or in the Washington, DC metropolitan area at 202-426-2675].

FOR FURTHER INFORMATION

Call Toll Free: 800-424-9065; in Washington, DC: 554-1404; outside USA: (Operator) 202-554-1404; Ed Klein, Director, TSCA Assistance Office, Office of Toxic Substances, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460.

Information can also be obtained from the "Current Intelligence Bulletin: Nitrosamines in Cutting Fluids" issued October 6, 1976, by the National Institute for Occupational Safety and Health.

ABOUT EPA ADVISORIES: The EPA uses Advisories to share information it has about chemicals. An Advisory is written to give individuals or organizations information they can use to make decisions about how to use chemicals safely or to answer other questions about safety that they may encounter. Advisories are distributed directly to the persons who can take action to reduce the risk.

"Chemical" Advisories

Chemical Advisories discuss toxic effects of chemicals of concern, routes of exposure, and alternative methods of reducing risks. They are written by EPA's Office of Toxic Substances after consultation with interested parties which could include companies, public interest groups, or other agencies. They are designed to be used where an increased awareness of potential risk is likely to lead to meaningful precautions, and are addressed and distributed to individuals or organizations for whom the information is most useful. Chemical Advisories are intended to encourage voluntary risk-reduction actions by individuals or organizations in instances where regulatory control is not appropriate or as interim measures while regulatory action is pursued.

United States
Environmental Protection
Agency

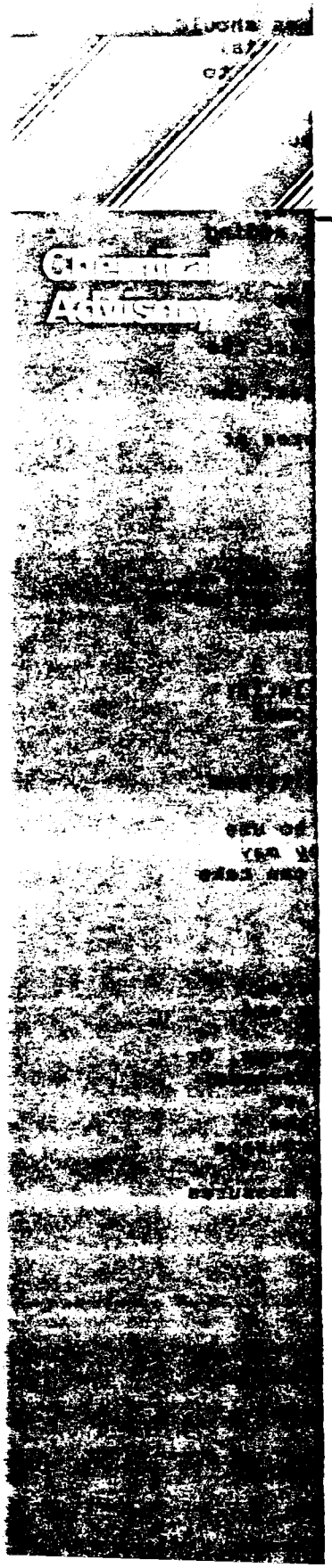
Office of Pesticides and
Toxic Substances (TS-799)
Washington DC 20460

September 1984

EPA

Notice to Formulators of Metalworking Fluids

Potential Risk from Nitrosamines



Summary

Manufacturers and users of metalworking fluids should not add nitrites to formulations containing amines because of the potential for nitrosamine formation. Many nitrosamines are potent carcinogens in animals and are suspected of causing cancer in humans.

Basis For Concern

Adding nitrites to metalworking fluids containing diethanolamine and triethanolamine results in the formation of N-nitrosodiethanolamine (NDELA), one of the nitrosamines of greatest concern. Significant levels of NDELA have been detected in such metalworking fluid concentrates.

Although other nitrosamines may be formed in metalworking fluids from amines other than diethanolamine and triethanolamine, there is particular concern about NDELA because:

- NDELA has induced cancer in rats and hamsters at several body sites.
- NDELA has induced cancer in rats at the lowest dose tested -- 1.5 milligrams per kilogram per day.
- NDELA is absorbed through human skin.
- Practices at machine shops may expose metal workers to high levels of NDELA.

Exposure To Nitrosamines

Everyone is exposed to low levels of nitrosamines through a variety of sources. However, exposure of machinists to NDELA from metalworking fluids may be as much as 100 times greater than the total exposure to the average person from all sources of nitrosamines combined. Further, other nitrosamines in addition to NDELA may be formed in metalworking fluids, and may pose additional risk.

Do Not Add Nitrites If Amines Are Present

- MANUFACTURERS should formulate metalworking fluids so as to minimize the potential for nitrosamine formation -- nitrites should not be added if amines are present. Although the major concern is from NDELA, which is formed by nitrosation of diethanolamine or triethanolamine, it would not be prudent to add nitrites if any amines are present because of the potential to form other nitrosamines.

- USERS should not add nitrites to metalworking fluids unless they are certain that amines are not present

Install A Warning Label

- Metalworking fluids containing both nitrites and amines should be labelled to warn machinists and other users of potential nitrosamine contamination. The label should advise users to avoid skin contact with these metalworking fluids. Workers should also avoid breathing mists of such fluids. The label should specifically indicate that nitrosamines may cause cancer in humans.

- Metalworking fluids containing amines, but not nitrites, should be labelled so that workers are warned against adding nitrites to minimize nitrosamine formation.

Notification Requirements

There are various Federal notification requirements for nitrosamine releases. Such releases could potentially adversely affect exposed individuals or adversely affect the environment. If you are aware of releases into the environment that may need to be reported, please contact the National Response Center (NRC) [call toll-free at 800-424-8802, or in the Washington, DC metropolitan area at 202-426-2675].

FOR FURTHER INFORMATION

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MATERIAL SAFETY DATA SHEET
COPY REQUEST

NAME: _____

EMPLOYEE REPRESENTATIVE: _____

TITLE: _____

(If employee representative, please provide the name(s) of employee(s) represented.)

WORK AREA: _____

JOB FUNCTION: _____

THE SUBSTANCE TO WHICH I AM ROUTINELY EXPOSED, AND FOR WHICH I AM REQUESTING A COPY OF A MATERIAL SAFETY DATA SHEET IS . . .

_____

(Employee must use a separate request form for each Material Safety Data Sheet requested.)

MY REASON FOR REQUESTING THIS INFORMATION IS . . . _____

_____

_____

DATE: _____

_____
(employee signature)

* * * * *

☐ I have received a copy of the MSDS for which I requested.

_____
(CHEMICAL NAME)

_____ DATE: _____
(employee signature)

☐ A copy of the MSDS for _____ which you have requested, is not available. We are making every effort to obtain a copy from our supplier.

DATE:

(Compliance Manager)

DATE:

(employee signature)

MATERIAL SAFETY DATA SHEET
EMPLOYEE REQUEST FOLLOW UP DISPOSITION

DATE:_____

SUBJECT DISPOSITION OF MSDS ON _____
(chemical name)

FROM:_____
(Compliance Manager)

TO:_____
(employee name)

_____
(department)

We have not been able to secure from our supplier a copy of the Material Safety Data Sheet on_____ which you have requested. We have now filed a complaint with the authorities requesting their assistance in obtaining the MSDS requested.

_____ DATE:_____
(Compliance Manager)

I have not received a copy of the MSDS on _____ which I requested, but I understand that my employer has made a good faith effort to obtain this document. My employer has provided a copy of the letters

to our supplier and the _____
(regulatory agency)
showing that a request was made for this information, and that subsequently a complaint has been filed seeking assistance in obtaining this Material Safety Data Sheet for me.

_____ DATE:_____
(employee signature)

This form should be completed in duplicate. One copy for the employee, the second signed copy for file.

CERRO COPPER PRODUCTS CO.
A member of The Marmon Group of companies
P.O. Box 681
East St. Louis, Illinois 62202
618/337-6000

October 12, 1984

Conoco
11605 Studt, Suite 118
St. Louis, Missouri 63141

Re: Material Safety Data Sheets

Gentlemen:

We buy the following material from you:

Conoco Super Hydraulic Oil 68 MSDS #20
Conoco Ice Machine Oil 68 #21
Conoco Redind Oil 150 #22

We need to have immediately the Material Safety Data Sheets. There must be a complete listing of all ingredients.

Please rush this information to us. Thanks for your cooperation.

Very truly yours,

CERRO COPPER PRODUCTS CO.
A member of The Marmon Group of companies

F. Baker Ottofy III

F. Baker Ottofy III
Director of Safety

FBO/jpl

bcc: D. Durham
C. Green

Mary Ann Chance
Coordinator
Hazard Communication Program

Conoco Inc.
P.O. Box 1267
Ponca City, OK 74603
(405) 767-2140

October 19, 1984

Cerro Copper Product Company
Post Office Box 681
East St. Louis, Illinois 62202

Attention: Mr. F. Baker Ottofy III

Dear Mr. Ottofy:

Attached as per request of Bill Spieler are Material Safety Data Sheets for the following Conoco Products:

Redind Oil 32, 46, 68, 100, Conoco
Ice Machine Oils 46, 68, Conoco
Super Hydraulic Oil 22, 32, 46, 68, Conoco

If we may be of further assistance, please contact Mr. Spieler or myself.

Mary Ann Chance /nle

Mary Ann Chance
Coordinator
Hazard Communication Program

nle
Enc. (3)

cc: Bill Spieler, St. Louis, Missouri

10-22-84
She will send updated MSDS
w/ info if on, if not
Nitrosamines are in them or not

PTS PRODUCTION TOOL AND SUPPLY CO.
620 SHENANDOAH AVENUE • ST. LOUIS, MISSOURI 63104 • TELEPHONE (314) 773-3030

October 17, 1984

Cerro Copper Products Co.
P.O. Box 681
E. St. Louis, IL. 62202

Attn: Mr. F. Baker Ottofy, III
Director of Safety

Gentlemen:

In reply to your letter request of 12 October 1984; we are enclosing herewith in duplicate, Material Safety Data Sheets covering "Tap Magic Cutting Fluids" in both the "Regualr Tap Magic" and the "Tap Magic for Aluminum".

These are the Standard Material Safety Data Sheets which have been furnished to McDonnell Douglas Corporation, General Motors Corporation, Ford Motor Company and others; and which are acceptable by these companies as well as by various Government Agencies, as the ingredients used in the manufacture of these products is propietary.

We trust this will be satisfactory and if we may be of any further service to you, please do not hesitate to contact us.

Very truly yours,

PRODUCTION TOOL & SUPPLY CO.

Mark G. Flick

MGF/cr

Enclosurers: two

CERRO COPPER PRODUCTS CO.
A member of The Marmon Group of companies
P.O. Box 681
East St. Louis, Illinois 62202
618/337-6000

October 12, 1984

Production Tool & Supply
620 Shenodoah Ave.
St. Louis, Missouri 63104

Re: Material Safety Data Sheet

Gentlemen:

We buy the following material from you:

"Tap Magic" (cutting fluid) MSDS #67568

We need to have immediately the Material Safety Data Sheet. There must be a complete listing of all ingredients.

Please rush this information to us. Thanks for your cooperation.

Very truly yours,

CERRO COPPER PRODUCTS CO.
A member of The Marmon Group of companies

F. Baker Ottofy III
Director of Safety

FBO/jpl

bcc: D. Durham
C. Green

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
CONOCO INC.	(405) 767-3456
ADDRESS (Number, Street, City, State, and ZIP Code)	
1000 South Pine, Ponca City, OK 74603	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Petroleum Hydraulic Oil	CONOCO SUPER HYDRAULIC OIL
CHEMICAL FAMILY	FORMULA
Petroleum Hydrocarbon	Grades 22, 32, 46, 68 Various Hydrocarbons

SECTION II—HAZARDOUS INGREDIENTS

NONE

Under all current laws, rules, and regulations, this material is considered non-toxic and non-hazardous.

SECTION III—PHYSICAL DATA

BOILING POINT (°F) Initial	600	SPECIFIC GRAVITY (H_2O = 1)	.85-.87
VAPOR PRESSURE (mm Hg)	Nil	PERCENT, VOLATILE BY VOLUME (%)	Nil
VAPOR DENSITY (AIR = 1)	NA	EVAPORATION RATE (_____ = 1)	Nil
SOLUBILITY IN WATER	Negligible		
APPEARANCE AND ODOR	Clear amber viscous liquid--no odor.		

SECTION IV—FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	FLAMMABLE LIMITS	Lel	Uel
380°F. - 400°F. (COC)			

EXTINGUISHING MEDIA

Foam, dry chemical, carbon dioxide, water spray.

SPECIAL FIREFIGHTING PROCEDURES

Do not enter fire area without proper protective equipment, including self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

None.

(Continued on reverse side)

SECTION V—HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

None established.

EFFECTS OF OVEREXPOSURE Not considered to be toxic orally or dermally; may cause eye irritation. May cause skin irritation on prolonged or repeated contact.

Excessive inhalation of mists and vapors may cause pulmonary disorders.

EMERGENCY AND FIRST AID PROCEDURES In case of eye contact, wash thoroughly with fresh water for at least 15 minutes and get medical attention. Skin contact--wash thoroughly with soap and water. Remove grossly contaminated clothing and wash before re-use. Grossly contaminated leather shoes should be discarded. If large amounts of material is swallowed, induce vomiting and call a physician.

SECTION VI—REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)* Strong oxidizing materials, heat, flame.

HAZARDOUS DECOMPOSITION PRODUCTS Normal combustion forms carbon dioxide and water vapor; incomplete combustion may produce carbon monoxide.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII—SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Clean up promptly by absorption in clay or earth.

WASTE DISPOSAL METHOD

Controlled incineration, store for professional removal and disposal. Avoid drainage into sewer unless it is specifically designed to handle hydrocarbons.

SECTION VIII—SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* None required.

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)* Normal shop ventilation.	OTHER

PROTECTIVE GLOVES None required.	EYE PROTECTION None required.

OTHER PROTECTIVE EQUIPMENT None required.

SECTION IX—SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING May be stored outdoors or indoors away from furnace or other heating equipment.

OTHER PRECAUTIONS In accordance with NFPA Code 30-1969 for Combustible Liquid, Class IIIB.

GPO 934-110

Form OSHA-20
Rev. May 72

Mary Ann Chance
Coordinator
Hazard Communication Program

Conoco Inc.
P.O. Box 1267
Ponca City, OK 74603
(405) 767-2140

October 23, 1984

Cerro Copper Product Company
Post Office Box 681
East St. Louis, Illinois 62202

Attention: Mr. F. Baker Ottofy III

Dear Mr. Ottofy:

As per your request, this letter will serve to certify that, based on the formulation constituents, Conoco's Senior Toxicologist, W. D. Broddle, Ph.D., would not expect to find nitrosamines in the following three Conoco products for which we have furnished you Material Safety Data Sheets:

Redind Oil 32, 46, 68, 100, Conoco
Ice Machine Oils 46, 68, Conoco
Super Hydraulic Oil 22, 32, 46, 68, Conoco

If you have further questions, please do not hesitate to call.

Mary Ann Chance/nle

Mary Ann Chance
Coordinator
Hazard Communication Program

nle

cc: W. D. Broddle, Ph.D.